University of Cape Town

Barriers and enablers to water access and community wellbeing in the Onesi constituency of Namibia: The case of Okalonga B and Onandjandja villages

MSc. specialising in Climate Change and Sustainable Development

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Declaration of authorship

I have read and understood the regulations governing the submission of an MSc dissertation, as contained in the rules of this University. I know the meaning of plagiarism and hereby declare that all of the work presented in this minor dissertation, save for that which is properly acknowledged, is my own.

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Abstract

The scarcity of water and especially the lack of safe drinking water have been accepted as amongst the most serious challenges facing the twenty-first century. The lack of access to water is a global problem that faces between 460 million to more than 1 billion people as a result of an increasing demand for water as well as a diminishing supply of water resources. The lack of access to potable water poses a great constraint on the societal and individual well-being for the inhabitants of the semi-arid regions of southern Africa and the key area needed to improve the sustainable development of water resources and services has been identified as water governance.

The aim of this research is, therefore, to understand how access to potable water affects the well-being of communities living in the Cuvelai-Etosha basin in Namibia and to understand how these communities participate in water governance. The *Okalonga B* and *Onandjandja* villages were used as case studies.The objectives of this study are to examine how water is accessed and determine what the barriers are in accessing potable water, to examine how the well-being of the communities in the two villages is affected by water access and to explore how communities are engaged in water governance. The overall methodology of the study was based on a qualitative approach to case study research. Interviews were conducted at the household level, the constituency and regional levels using semi-structured interview guides.

The study found that the communities of Okalonga B and Onandjandja access water through hand-dug wells, private and communal taps, Etaka dam and Oshana, and boreholes. A total of 6 barriers to accessing potable water were identified. These included distance to communal taps, amount of water one can carry, administration of water infrastructure, maintenance of water infrastructure, ability to pay the set water fees and specific times allocated for collecting water. The barriers to accessing potable water negatively affect the well-being of communities. Communities felt that they would have better economic opportunities if they had access to potable water which would in turn improve their well-being and livelihood opportunities. Furthermore, the study found that community participation in water governance was poor.

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This dissertation is dedicated to my mother, Mrs. Olivia Ndapewa Shooya, who has always encouraged me to reach beyond the stars.

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List of acronyms

ASSAR	Adaptation at Scale in Semi-Arid Regions
CBM	Community-Based Management
DRWS	Directorate of Rural Water Supply
GWP	Global Water Partnership
UNDP	United Nations Development Programme
WeD	Well-being in Developing Countries

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Chapter 1: Introduction

1.1. Introduction

The lack of safe drinking water and water scarcity have been accepted as one of the most serious challenges facing the twenty-first century (Elimelech, 2006). Water is a critical resource for the 200 million residents of the southern African region (Hossain&Helao 2008), with approximately one-third of this population living in drought-prone areas where water shortages impact well-being and are a barrier to increasing crop and food production (Manzungu, 2004). Additional demands for water as a result of population growth and climate change have the potential to lead to even stronger competition among the respective water uses and users (Bock et al. 2008; Guardiola et al., 2011). This will require decisions to be made about the allocation and conservation of water in a manner that is compatible with the societal, economic as well as environmental objectives of countries and sectors (Bock et al. 2008). Understanding the governance of water is, therefore, vital in ensuring that potable water is accessible to all in an equitable manner as outlined by the recently adopted sustainable development goals (Bock et al. 2008). If water is not governed well, the potential negative implications for global and especially community level freshwater resources are staggering (Rockström et al. 2014).

The Global Water Partnership (2002) defines water governance as "the range of political, social, economic and administrative systems that are in place to develop and manage water resources, and the delivery of water services, at different levels of society." Governance embraces the relationship between government and society, and provides a way of conceptualising the array of relationships between government and society (Global Water Partnership (GWP), 2002; Franks & Cleaver 2007). An understanding of water governance may, therefore, lead to a deeper understanding of the social organisation of a community as well as the political processes involved in resource allocation (Coles and Wallace, 2005; Franks & Cleaver 2007). Furthermore, understanding how water is governed assists in providing an understanding of the way organisational resources and social structures support

or constrain the most disadvantaged communities. It also helps to understand how governance outcomes might support of the most disadvantaged communities, as well as understand how these communities cope with, and are affected by, changes in accessing water on a daily, short-or-long-term basis (Franks & Cleaver 2007).

Access to an adequate supply of freshwater to meet basic needs has been recognised as a human right (Hossain&Helao, 2008). The lack of access to water is a global problem that faces between 460 million to more than 1 billion people as a result of an increasing demand for water as well as a diminishing supply of water resources (Hossain&Helao, 2008; Bock et al., 2008; Bakker, 2012). The scarcity of water poses a great constraint on the societal and individual well-being for the inhabitants of the semi-arid regions of southern Africa (Kgathi et al. 2006). Furthermore, poor quality water causes diseases such as diarrhoea and cholera, responsible for around 5% of the total deaths in the world (Guardiola et al., 2011). Low quality water, therefore, affects the health of individuals and subsequently their happiness. According to Guardiola et al. (2011) water scarcity, lack of water quality and access to water in general is a very important issue in developing and developed countries that has not been prioritised in happiness research. The reduction of deaths and diseases from unsafe water as well as inadequate water supplies continues to be a priority for developing countries and international organisations, and development institutions (Sultana, 2013a). Furthermore, gender-water relations will be changed due to exacerbated water shortages as a result of climate change (Sultana, 2013b). It is, therefore, vital to undertake critical multi-scalar analyses that can better inform the water-related policy making processes (Sultana, 2013b).

This study will assess how access to water affects the well-being of some rural communities in the north-central region of Namibia as well as explore how these communities are engaged in water governance, using two villages in the Cuvelai-Etosha basin in Namibia as a case study. Good water governance practices encourage land-use practices that take into account the various uses of water and its availability (Rockström et al. 2014). There is a great need for research that helps understand the relationship between water-related aspects and well-being because of the important role water access plays in the lives of people (Guardiola

etal., 2011). This study will add to the knowledge gap of the relationship between water access and well-being, and water governance at the community level.

1.2. Problem Statement

This study addresses the problem of access to potable water in the Omusati region of Namibia with the use of two villages as case studies. The study further explores how access to potable affects the well-being of communities of the two villages. This study was conducted due to the fact that only 59% of households have access to a supply of potable water, in the rural areas of Namibia,. A total of 16% of this population are dependent on unsafe water from rivers or streams whereas another 13% rely on contaminated water from wells that are not protected. For the Omusati region, the focus of my research, only 52% of the total population have access to a safe supply of water (NSA, 2011). The study further looked at the effects of access to potable water on the well-being of communities because studies in other countries have found that the development and well-being of a community as a whole is negatively impacted by any limitations or shortfalls in the provision of safe water (Remmert, 2016). Studies also found that clean water plays an important role in creating better futures for the poor as it creates opportunities for income-generating activities (Sultana, 2013a). Furthermore, studies have found that the most common causes of illness and death among poor people of developing countries are diseases associated with unsafe water, poor sanitation and lack of hygiene as a result of poor access to a sufficient supply of potable water (Bartram et al., 2005). Water-borne pathogens are often transmitted through drinking water that has faecal contamination (Ashbolt, 2004). .

1.3. Aim and objectives

The **aim** of this research is to understand how access to potable water affects the well-being of communities living in the Cuvelai-Etosha basin in Namibia and to understand how these communities participate in water governance. The *Okalonga B* and *Onandjandja* villages were used as case studies.

In order to achieve this aim, the **objectives** of this study are as follows:

1. To examine how water is accessed and determine what the barriers are in

accessing potable water for the communities.

2. To examine how the well-being of the communities in the two villages is affected by water access.

3. To explore how communities are engaged in water governance.

1.4. Contextualisation of study within the ASSAR project

This research falls under the Adaptation at Scale in Semi-Arid Regions (ASSAR) project as part of 'phase 2' which runs from 2015 to 2017, which focuses on research. The ASSAR project has focused on deepening the understanding of climate vulnerability and adaptation in semi-arid regions in Africa and India. It has also focused on understanding opportunities to transform adaptation practices currently taking place to ones that achieve proactive, widespread climate adaptation that is rooted in activities of development at different governance scales in order to improve adaptive livelihoods for vulnerable groups. ASSAR's focus is specifically on the on-going research that looks at the cross-scale links between community and sub-national levels.

Chapter 2: Literature review

2.1. Understanding water governance from a rural area context

The 2000 Hague Ministerial Declaration called for "governing water wisely to ensure good governance, so that the involvement of the public and the interests of all stakeholders are included in the management of water resources" (Rogers and Hall, 2003). The key area needed to improve the sustainable development of water resources and services has been identified as water governance (Rogers and Hall, 2002). Water governance deals with "issues of access to decision-making, equity, cultural and political practices in delivering, sharing or competing for services and perceptions of local ownership of natural resources, while highlighting the role that different actors, including state institutions play in these processes" (Allen et al., 2004). Moreover, water governance encourages the participation as well as the inclusion of local communities in managing their water resources, and affects the way in which water is managed at the different levels of society (Garande and Dagg, 2005). In essence, effective water governance calls for the politics of inclusion and participation by all the stakeholders when it comes to managing their water resources (Garande and Dagg, 2005). It goes beyond just national-level water legislation, regulations and institutions; it is also about the processes that are in existence to promote public participation in the design of water and sanitation systems. Furthermore, water governance is also about where decisions are made (e.g. in the capital city or the community itself) as well as how and by whom (Boege, 2009).

Sound water governance is essential in addressing the water crises that is facing the world and ensuring that water is accessible to everyone (Rogers and Hall, 2002). There is a notion that the current global water crisis is not a result of water shortage or lack of technology but rather a result of a governance crisis (Alexander, 2002).Water governance is defined as "the range of political, social, economic and administrative systems that are in place to develop and manage water resources, and the delivery of water services at different levels of society" (Rogers and Hall, 2003). Social relations and their processes determine the outcomes of

water governance arrangements (Franks & Cleaver, 2007) as water has a tendency of being distributed unevenly among the different social and income groups of a community. This often results in the poor having the least access to water. This arrangement defines their livelihood opportunities as well as the ability for them to live a decent and healthy life (Rogers and Hall, 2002). For governance to be effective at the local level, a bottom-up approach to development is required as well as the participation of communities at the lowest level of society in development projects (Garande and Dagg, 2005). A study conducted by Zooneveld (2001) that was aimed at assessing participation in water governance found that citizens would be more eager to participate when they felt that their input would have a direct impact on local governance or when they felt that the initiative had aims that would positively affect their daily lives.

There are around three levels of participation of local stakeholders in water governance. The first type of participation is when stakeholders are kept informed of the different activities in order to ensure that any planned interventions are adhered to (Cornwall, 2002). The second type of participation is when the local people form their own committees so that they can influence the implementation of projects as well as be a part of the consultation process. This type of participation from the water users is usually linked to the sharing of costs of service delivery and the recurrent costs (Cornwall and Gaventa, 2000; World Water Development Report, 2003). The third type of participation is when stakeholders participate and influence the decision-making process. This type of participation also occurs when stakeholders share the responsibilities in implementing projects (European Commission, 2003) and has been considered to be part of "good governance reforms that promote decentralisation" (Cornwall, 2002: 14).

2.1.1. Case Study Context: Namibia

Namibia gained its independence in 1990. Prior to independence access to water was regulated by the South Western administration under the jurisdiction of the colonial South African state (Schnegg, 2016). Very little coordination was required from the state as long as

long as it covered the costs required for establishing, maintaining and running the infrastructure (Schnegg et al., 2016). Local level governance was mostly under the authority of the political authorities including headmen and chiefs (Schnegg, 2016). These headmen and chiefs (and sometimes a person with a vaguely defined linkage between a household head and a traditional authority) governed the land and it's embedded perennial water sources and also regulated access rights such as benefit sharing (Wallace &Kinahan, 2011; Schnegg & Bollig, 2016). The users were thus 'under' a chief that was acknowledged by the administration and therefore, respected his rights to regulate access to natural resources. Furthermore, any newcomers to a grazing site would have to ask the chief for permission to settle and use the pastures and water in the area as consent to use grazing implied that the right to access water in this area was given (Schnegg & Bollig, 2016).

As part of the decentralisation process in Namibia, rural water governance has changed considerably since the early 1990's. After independence in 1990, the country's environmental legislation (in accordance with global environmental policies) transferred the responsibility to manage natural resources to the local user associations as a shift towards self-governance (Schnegg, 2016; Schnegg et al., 2016). This transfer of responsibility was done on condition that communities had management plans that defined and delineated user groups and governance structures as well as the way in which cost-benefit sharing was to be conducted (Schnegg & Linke, 2015). This process was aimed at empowering the people and the transfer of authority and assets to the community (Schnegg, 2016) and is referred to as the community-based management (CBM) strategy. The CBM strategy is the most dominant form of rural water management in the southern African region (Van den Broek and Brown, 2015). The objectives of the CBM strategy were to "ensure the provision of safe drinking water to communal areas as well as make communities the owners of water facilities" and improve the coordination of water from a national to a local level (Republic of Namibia, 2008). Furthermore, the strategy was aimed at extensive involvement of communities in water supply and management through their elected water point committees (Republic of Namibia, 2008).

The strategy further envisioned that the local communities would be responsible for managing their water infrastructure through funds that were collected by the community (Remmert, 2016). This meant that in many rural communities, user associations administer water and set the rules for their management practices (Figure 1). These rules that have been set also typically define boundaries and specify contributions that vary for members and outsiders (Schnegg & Bollig, 2016). Furthermore, the newly formed water associations had to share the costs of providing water as well set up rules that addressed the issue of non-members using their water points (Schnegg & Bollig, 2016). A study conducted by Falk et al. (2009) has, however, shown that additional financial burdens are created when economic responsibility is put in the hand of the users. This burden is difficult to carry, especially by the poor as they already have their own financial burdens (Falk et al., 2009).

Name:	Responsibilities:
Water Advisory Council	1. Advises Minister on: water policy de-velopment and review; 2. Water resource management; 3. Water abstraction and use; 4. Any matter raised by basin management committees deemed pertinent enough by the Council; 5. Any matter related to the administration of the Act
Water Regulator	1. Determines fees and tariffs for the provision of water as well as licence fees charges of water abstraction licence holders; 2. Negotiates operational targets with water service providers; 3. Monitors performance and compliance of service providers with regards to operational targets as well as compliance with water service plans and water management strategies (conservation); 4. Notifies Minister of any non-compliance
Basin Man-agement Com-mittees	1. Advises Minister on matters of protection, development, conservation management and control of the respective basin's water resources; 2. Makes recommendations on water licence applications to Minister; 3. Promotes community engagement with management of basin's water resources; 4. Prepares or initiates a basin IWRMP; 5. Makes recommendations to Minister regarding licence holders; 6. Monitors and reports on effectiveness on policies in achieving sustainable water management; 7. Collects, manages and shares relevant data including: irrigation; helps resolve conflict related to water resources; 8. Coordinates with regional councils & local authorities were appropriate and conducts a water research agenda
Water Point Committees & Local Water Committees (Rural water supply)	Manages and controls the supply of water at a specified water point/rural water sup-ply scheme or part thereof

Figure 1. Roles and responsibilities of the various stakeholders in the rural water supply sector (Source: Remmert, 2016).

According to Werner (2009), the Namibian policy on rural water supply points out that the local communities were transferred ownership of water points. The ownership of water resources below and above the surface of the land, however, lies with the state. Furthermore, the facilities of rural water points and supply schemes are leased to Water Point User Associations and Water User Associations by the state. Open water sources are open to anybody with restriction (open access). The hand-dug wells, which play a significant role in water provision, are owned by those responsible for digging them on their land. They, therefore, have control over the access of the water. These wells are not governed by the Water Resources Management Act (Werner, 2009).

2.2. Water access

2.2.1. Modes of access

The manner in which people obtain water significantly differs around the world. Accessing water through different means is the norm for many villages in Africa (Crow and Cruz, 2001). Five general ways in which people obtain access to water or 'modes of access' have been described by Crow (2002:42). The first mode of access is private ownership of land that has a water source. The second mode of access is common property access which refers to accessing water through communal rights. The third mode of access is open access which refers to accessing a common resource without any regulations. The fourth mode of access is state-backed provision which refers to local or national projects such as pumped water for irrigation or municipal groundwater. The fifth and last mode of access is market access which refers to the purchasing of water (Crow, 2002).

According to Crow (2004), how people gain access to water is determined by three conditions, namely; social, technical and physical. The social characteristics include labour, time, cost in monetary terms, the way in which decisions are made and who makes them as well as the way long-term processes may change. These characteristics may differ depending on the mode of access. The technical characteristics consist of the technologies as well as the processes of innovation that are connected to the specific mode of access. The environmental characteristics are determined by the sustainability of the mode (Crow, 2002).

As an example of the third mode of access in a village; common rights, social arrangements to maintaining the water sources and rationing the use of the water sources may have been established by the communities of the village. Furthermore, water user groups or associations are usually formed to control water access and rights. Common property rights often allow for a wider social access to water but that water is often of low quality and obtaining the water involves a high amount of time (Crow and Sultana, 2002).

2.2.2. Barriers to accessing potable water

Access to water in rural areas is in general not as secure as in urban areas and requires a higher degree of work, time and money. Furthermore, access to water in rural areas has more problems, is more differentiated and less secure (Crow and Sultana, 2010). The majority of African pastoralists, until approximately 50 years ago, would use natural springs, surface water and hand-dug wells as their water source. These were usually managed with the adjoining pastures (McCabe, 2004). These practices, however, changed significantly around the 20th century in many parts of Africa. Boreholes have now been drilled and groundwater is being extracted for use by households and livestock.

The challenges to accessing a safe and reliable source of water are complicated and interlinked. According to Kevany and Huisingh (2013), challenges to accessing water can be categorised into the following issues: damage to accessible and safe water supplies, water management systems that are not functioning effectively or that are disjointed, local and global activities or practices that undermine the distribution as well as erode the rights to accessing water, climate change and increase in concentrated populations. Furthermore, municipalities cannot keep up with the growing populations and have, therefore, not expanded their water management infrastructures rapidly enough (Kevany and Huisingh, 2013).

A study conducted by Sullivan et al. (2003) in poor urban communities in Sri Lanka showed that the amount of time it takes to collect potable water because of the distance played a significant role in the communities' ability to access potable water. Moreover, because the amount of taps was few, people would queue for a substantial amount of time. Other communities could not access potable water because of their inability to pay for the water. All these factors forced people to switch to polluted sources that were easier to access (Sullivan et al., 2003). Another factor that contributed to these communities not having access to potable water was the inadequate, under-funded or sometimes poorly managed water infrastructure. These factors often lead to availability of water being uncertain

(Sullivan et al., 2013). Generally people in developing countries have to spend a considerable amount of time and money to gain access to potable water (Roy and Crow, 2004).

2.3. Water access and well-being

2.3.1. The social conception of well-being

Well-being is defined as "a state of being with others, which arises where human needs are met, where one can act meaningfully to pursue one's goals, and where one can enjoy a satisfactory quality of life" (WeD Group). The well-being concept originated in the development economics and social psychology discourses. The social conception of well-being was developed by the Research Group on Well-being in Developing Countries (WeD). Their definition on well-being links human interest and ecological systems (Armitage et al., 2012). This definition has set out a three-dimensional approach to the way in which human well-being is assessed.

The approach consists of a material dimension which puts emphasis on the resources that people have as well as to the extent to which the needs of the individual are met; a relational dimension which puts into consideration to what extent social relationships create an enabling environment for the individual to act in a meaningful way in pursuit of what they regard as well-being; and a cognitive dimension through which the individual's level of satisfaction with the quality of life is taken into account (Britton & Coulthard, 2013: 29). Infrastructure, access to services and the state of the natural resources are important for understanding the 'enabling or constraining' environment for an individual to reach their desired level of well-being (Britton & Coulthard, 2013). Key elements of material well-being include income, income diversification and education (based on a case study on fisheries communities in Northern Ireland) (Britton &Coulthard, 2013). Material, relational and subjective dimensions overlap and are interlinked strongly but need to be analysed separately in order to have more knowledge on each dimension as well as make clearer inter-relationships between them (Britton &Coulthard, 2013).

As the societies we live in change so does the social construction of well-being (Mcgregor et al., 2009). Well-being is an "objective of development and an approach to understanding experiences and perceptions of people in their effort to live-well" (Armitage et al., 2012: 1).A social conception of well-being is a combination of the individualistic and basic needs aspects of well-being within the broader social-psychological and cultural needs required to live a good life(Armitage et al., 2012). The social conception of well-being is understood as "a scale-sensitive and emergent property of the interplay of the objective (e.g. people's circumstances shaped by material and relational dimensions) and the subjective (e.g. values and perceptions) dimensions of agency and capabilities"(Armitage et al., 2012).

The three dimensions (material, relational, subjective) of well-being are important in understanding the ways in which the different aspects of "life well lived" come together (Armitage et al., 2012).More simply explained, well-being is a way of living, a process that is many dimensions in which people live their best lives. Furthermore, it is all about "developing as a person, being fulfilled, and making a contribution to the community" (Blackmore, 2009: 5).

2.3.2. Water access and well-being

A set supply of clean water is fundamental for people's health as well as for social cohesion. Access to clean potable water opens up opportunities for new goals such as the ability to work, learn, or attend a school instead of carrying water for hours on end (CuveWaters, n.d.). According to Guardiola et al. (2011), the factors that determine happiness and subjective well-being have been explored but the majority of this literature has not taken into account the role that is played by water. The scarcity of clean water means that people have to walk long distances on a daily basis to collect water that turn out to be of poor quality. Furthermore, energy and time that can be spent more productively on for example education is wasted as a result of water being far. It can, therefore, be hypothesised that the greater the distance to the water source, the higher the pressure on an individual's well-being

(Guardiola et al., 2011).

A study conducted by Musingarabwi (2016) in the Onesi constituency of Namibia, showed that women spend a disproportionately high time on domestic work such as collecting water when compared to their male counterparts, which negatively affects the way they experience their wellbeing. The same study further found that women have lower subjective wellbeing because of their strenuous workload. Berik & Kongour (2015) found that time allocation and experience of time burdens is gender sensitive. The study found that as a result women's work load and the way they choose how they allocate time for work is often negatively affected (Hope, 2006).The development and well-being of a community as a whole is negatively impacted by any limitations or shortfalls in the provision of safe water (Remmert, 2016).Clean water plays an important role in creating better futures for the poor as it creates opportunities for income-generating activities (Sultana, 2013a). According to Payne et al. (2008) water access contributed to doubling the income of poor rural women in developing countries. Furthermore, Kevany and Huisingh (2013) found that the well-being of families generally increased as a result of an increase in income.

The most common causes of illness and death among poor people of developing countries are diseases associated with unsafe water, poor sanitation and lack of hygiene as a result of poor access to a sufficient supply of water (Bartram et al., 2005). Water-borne pathogens are often transmitted through drinking water that has faecal contamination (Ashbolt, 2004). It is estimated that 1.6 million deaths that occur each year are a result of diseases related to the aforementioned factors (Bartram et al., 2005). Sultana (2011) found that the women are especially confronted with many issues that negatively impact their physical health, their children's and partners as a result of collecting and consuming unreliable water. Another study conducted by Wutich (2009) found that women and young girls have higher self-esteem issues when they cannot conform to the social norms of hygiene. Sultana (2011) and Stevenson et al. (2012) both concluded that stress and water insecurity have a positive correlation. Poor mental health was found more in women who experienced greater water insecurity (Sultana, 2011; Stevenson et al., 2012).

2.3.3. Gender-water relations

The ability for men and women to respond to and cope with extreme changes in socio-ecological relations often place them in differentiated positions because of patriarchal norms and inequalities (Sultana, 2013b). Furthermore, patriarchal norms and inequalities also foreground the complicated manner in which social power relations affect the responses to adaptation strategies in communal areas. This was especially evident in tasks that were water related and in agrarian societies of south Asia (Sultana, 2013b). According to Franks and Cleaver (2007), the great majority of literature on governance especially water is gender blind. In addition, the social difference dimensions that shape access to as well as control over water for women are usually not addressed (Cleaver and Hamada, 2010). Franks and Cleaver (2007) further suggest that there is a large amount of evidence that suggests that access to water and participation in governance institutions has a gendered patterning. The Sustainable Development Goals have a specific emphasis on key gender goals (Gender and Water Alliance, 2006). Securing improved access to water is seen as a great part of these goals. The Gender and Water Alliance (2006) suggest that good water governance can have a positive effect on gender relations as it ensures that men and women have the ability to claim their rights. Furthermore, they are able to equally negotiate over water allocation plus work as partners in the management of their water supplies in an equitable and sustainable manner that ensures their livelihoods are improved (Gender and Water Alliance, 2006).

The lack of water that is socially and ecologically feasible has the ability to negatively impact gender roles and relationships in a household or community. Furthermore, the lack of safe water can affect the health and well-being of the members of a household which increases the household's vulnerability and poverty. This increase in vulnerability and poverty can stain the reproductive and care-giving roles of women (Sultana, 2013b). In Namibia, women and men's social roles and responsibilities are differentiated as well as their relationships with the environment and its ecosystem services (Angula & Menjono, 2014). The majority of Namibian women constitute the workforce responsible for fetching water, collecting wood and crop cultivation (Republic of Namibia, 2010). This is similar to other rural areas in the

global south where water collection is the responsibility of women (Crow and Sultana, 2010). In Senegal for example, women spend 17.5 hours per week fetching water. In Mozambique, women spend 15.3 hours per week collecting water in the dry season (Crow and Sultana, 2013). A study conducted by Angula & Menjolo (2014) in the Oshana region of Namibia, found that women and girls had to travel long distances to fetch water as a result of increased water shortages that were linked with low rainfall events or flooding that was associated with above normal rainfall. Low rainfall events also resulted in women having to take up more responsibility as their male counterparts had to migrate in search for grazing for the livestock (Angula, 2010). In another study conducted by Crow and Sultana (2010), it was found that women and girls in Bangladesh walk up to 5 hours a day in order to collect water. This work involved in gaining access to water may lead to women having to make difficult choices such as foregoing accessing better quality water in order to keep children in the household safe and make sure all the chores are done. Furthermore, young women and girls may have to stay away from school in order to undertake the time-consuming task of collecting water each day (Crow and Sultana, 2010).

A study conducted by Kevany and Huisingh (2013) showed that women in the global south experience pressure from their spouses to ensure that there is water available in the household. They are also pressured to ensure that they secure water for the household. Furthermore, the study revealed that the shortage of water had negative impacts on marriages and violence towards women increased as they are subjected to domestic violence if they are unable to collect sufficient water. Moreover, there were cases of public threats of sexual violence towards women and girls when they were collecting water and seeking latrine facilities (Kevany and Huisingh, 2013).

2.4. Conceptual Framework

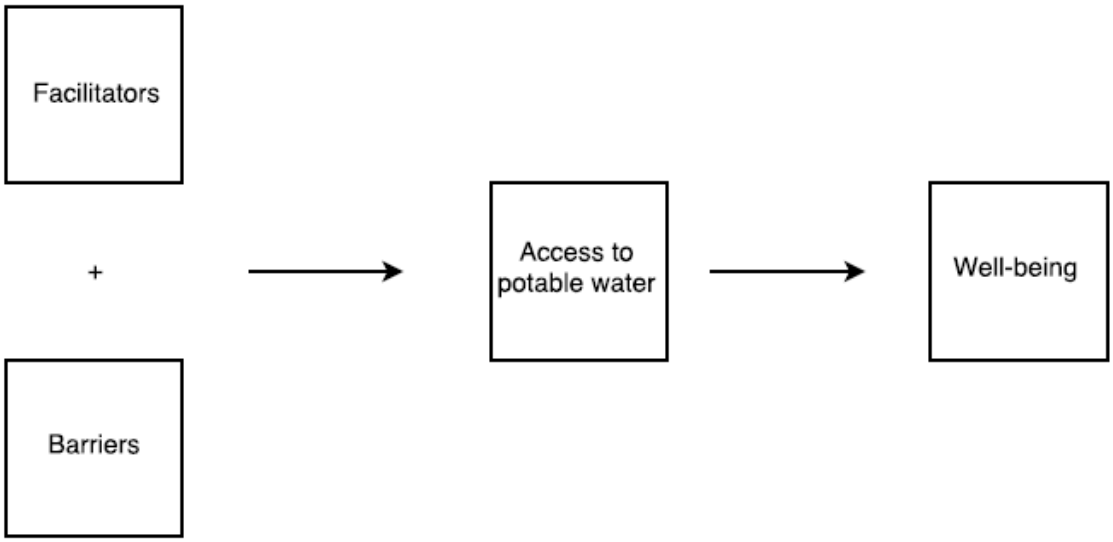

Figure 2. Conceptual framework of this study (Source: Author).

As indicated in Figure 2, facilitators and barriers affect access to potable water which then affects the well-being of communities. Facilitators in this study include sources of accessing water and the means of accessing water. The means further consist of modes of accessing water and the governance which includes policies, institutions and user participation. The barriers consist of social, environmental and technical constraints to accessing potable water. These have been addressed in chapters 4 and 5.

Chapter 3: Context and Methodology

This chapter describes the study area in which the research was conducted. It further gives a description of the two villages in terms of their location. The chapter also describes the methodological approach taken in obtaining data to achieve the aim and objectives of this study. The chapter further describes the specific interviews that were conducted and explains the data analysis process. Moreover, the chapter explains the limitations of the study as well as the ethical considerations.

3.1. Study Area

3.1.1. The Cuvelai-Etosha Basin

The two study sites (Figure 4) are located in the Cuvelai-Etosha basin which is situated in northern Namibia in the Onesi constituency of the Omusati region. The two study sites are considered villages, the lowest level of settlement, according to Namibia's land policy (LAC, 2005). A village is this context is roughly described as an area consisting of a number of sparsely distributed homesteads with a headman involved de facto in land administration. A headman is defined by the Traditional Authority (TA) Act as "the supreme traditional leader of a traditional community designated in accordance with the Act (LAC, 2005). The families of the different homesteads do not have to be related but are usually from the same ethnic group.

Okalonga B is located 10.4 km north of Onesi, the district capital of the Onesi constituency, whereas Onandjandja is located 17.3 km west of Onesi (Figure 4). Okalonga B consists of 16 households with an estimated population of 128 inhabitants. Onandjandja consists of 138 households with an estimated population of 1104 inhabitants (personal communication, Rural Water Supply officer for Onesi constituency, 11 September 2017). There is usually an abundant supply of water during one half of the year while the rest of the year can be dry which makes the people in the basin dependent on piped water supply. The availability of

water is unreliable as a result of the unpredictable and variable rainfall. The rainy season usually lasts from October to March and the average annual rainfall is approximately 470 mm (CuveWaters, n.d).

The majority of the residents live in rural areas (villages) in traditional homesteads compared to urban areas. The water supply system consists of an open canal which provides nearby communities with piped drinking water (CuveWater, n.d). Communities that live further from the canal are dependent on water from hand-dug wells and seasonal flows of shallow surface water streams (*Iishana*), as well as the Olushandja dam (Figure 4) for the communities living adjacent to it. The Olushandja dam is known by these communities as Etaka dam and will be referred to as such in this study. The contamination of water in the hand-dug wells with algae, faeces and parasites can be high and can, therefore, impact the health of those that drink from it with children being most susceptible (CuveWater, n.d).

The Olushandja Dam, established in 1973, is one of the largest permanent water bodies within a 200 km radius (Burke, 2000). The dam is an artificial water body that is permanent (Figure 4) and located in the ephemeral Oshana wetlands in the northern part of the country. The dam was constructed to balance the main water supply canal and to serve as a water supply source for the northern regions in case of emergencies. All water, apart from the rainfall and runoff, is pumped from the Kunene River (Burke, 2000). The dam plays a significant role for communities living adjacent to it such as those from Okalonga B because it provides a permanent water source to these communities. It also provides food (fish) to these communities and improves livelihoods through small-scale irrigation, and livestock farming (Burke, 2000).

3.1.2. Onesi Constituency

Onesi is one of 12 constituencies in the Omusati Region which is situated in the North-central part of Namibia. The region borders Angola in the North (Figure 3) and is part of the Cuvelai-Etosha water basin. The Oshiwambo speaking people are the largest group of inhabitants of

the Onesi Constituency with other ethnic groups such as the *Ovathemba,Ovandongona* and *Ovatua* also residing there(Mendelsohn et al., 2002). Administratively it falls under the Omusati Regional Council, Onesi Constituency as per Regional Councils Act No. 22 of 1992 (Hegga et al., 2016).Subsistence crop and livestock farmers make up the majority of the people that live in the area. The three key sources of livelihoods are crop farming, livestock farming and pensions/social grants (Namibia Statistics Agency, 2014). The main agricultural produce is pearl millet (*mahangu*) with other crops such as sorghum, maize and ground nuts also being cultivated (Mpofu and Petrus, 2014).

According to the 2001 national census; the Omusati region has a total population of 243 166 people with slightly more females (133 621) than males (109 545). The age group with the highest amount of people is 15-59, followed by 5-14, under 5 year olds with 60+ being the age group with the lowest amount of people. The main source of income consists of pension (31%), wages and salaries (25%), farming (22%), businesses not related to farming (10%), and cash remittance (5%). The majority of homesteads are female-headed (55%) The main public services for the rural areas in the region are water, sanitation, electricity, hospitals and schools (NSA, 2011). These services are not available to the entire population of the region. Accessibility is depended on the homestead's location. Services such as water supply, sanitation and electricity are not common.

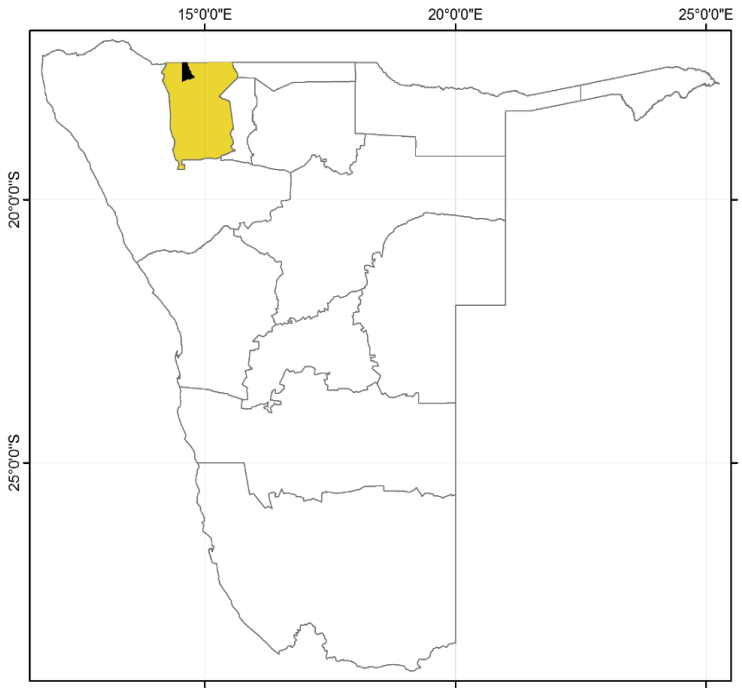

Figure 3.Onesi constituency (Source: Kunamwene, 2016).

Figure 4. Map representing the study sites as well as the Olushandja dam i.e. Etaka dam (source: Author).

3.2. Methodological Approach

The overall methodology of this study is based on a qualitative approach to case study research. Interviews were conducted at the household level, the constituency and regional levels using semi-structured interview guides. According to Carey (2009), semi-structured questionnaires are combinations of questions that have been pre-planned as well an unplanned thus providing an opportunity to come up with new questions as a response to the answer of the participant. Furthermore, this type of questionnaire is a convenient as well as a cheap method of collecting information and it allows for a two-way discussion between the interviewer and respondent (Carey, 2009). Key informant interviews, on the other hand, are a good way to collect information from people who have first-hand knowledge on a specific subject (Patton, 2015) which in this case is water governance. Key informants are people who have knowledge on a topic and are willing to share their knowledge (Patton, 2015). The water governance questions were guided by the United Nations Development Programmes' (UNDP) User's Guide on assessing water governance of 2013. The well-being questions were guided by the Well-being in Developing Countries (WeD) Working Group's Quality of Life framework which an instrument developed to measure subjective well-being (Copestake&Camfield, 2009).

Prior to going into the field, a letter was sent to the Omusati Regional Council in order to inform them of the intention to conduct research in the area as well as specify what type of information will be collected. The letter was also sent for the Omusati Regional Council to inform the communities about researchers that will be coming to conduct interviews with them. This is part of the general protocol in the area.

Also as part of the general protocol in the area, I had to go to the Omusati Regional Council office in Onesi to introduce myself to the Control Administrative Officer and state the reason for my visit. The Control Administrative Officer then helped me identify two villages (through purposive sampling) based on the fact that they both had households that had challenges in accessing potable water. Due to time constraints and because the interviews

were being conducted during a busy time of the year (August/September), the researcher could not pre-select which houses to visit as this would have allowed for a more structured selection of sex, age and vulnerable groups.

After determining the village in which my research will take place, my arrival and purpose of research was announced to the communities of the two villages through the radio by the same representative of the Regional Council in Onesi. This was done so that the community members were aware of my presence. Furthermore, the same representative of the Regional Council also informed the Traditional Authority office of my presence.

A total of 20 community members were interviewed from different households in the two identified villages which were *Okalonga B* and *Onandjandja*. Of these 20 people, a total of 12 individuals were interviewed from *Okalonga B*and 8 individuals were interviewed from *Onandjandja*. Interviews were conducted with the individual that was at home at that time because there were many activities taking place which had people travel to the towns nearby or to other villages. There were, however, occasions when I asked for a specific age structure or gender in order to get a fairer representation of different social groups and genders. More individuals were interviewed from Okalonga B because this village is closer to Onesi and the homesteads were located closer together. The homesteads in Onandjandja were more remote and further apart. Furthermore, more homesteads in Onandjandja seemed to have been empty at the time of visit. The social differentiation of the community members that were interviewed is as follows (Table 1):

Table 1.Number of different age groups and gender of people that were interviewed in Okalonga B and Onandjandja.

Age Structure	**Okalonga B**		**Onandjandja**	
	Female	**Male**	**Female**	**Male**
Adult	3	3	3	1
Youth	3	1	1	1
Elderly	1	1	1	1

In order to obtain information related to water governance at the regional level, an extension officer responsible for the Onesi constituency under the Directorate of Rural Water Supply was interviewed. This representative was interviewed at the offices in Outapi. Two representatives from the Water Point Committees of the two villages (one from each village) were also interviewed in order to obtain information related to water governance at the constituency level. These two representatives were identified with assistance from the same extension officer under the Directorate of Rural Water Supply. The Water Point Committee representative was found at the communal tap because none of them could be reached beforehand. She was then interviewed after carrying out her responsibilities at the tap. I managed to get hold of the Water Point Committee representative beforehand and was able to set up a meeting with her. A representative of the Traditional Authority office was also interviewed in order to obtain information related to water governance at the constituency level. His contact details were obtained from the representative of the Regional Council in Onesi. I then contacted him to set up a meeting. He was interviewed in his office in Onesi.

3.3. Methods

Two sets of interview guides were developed (Appendix A). The one targeted to the communities was translated into *Oshiwambo* (the local language) and these interviews were conducted in *Oshiwambo* as this is the language most people were comfortable in expressing themselves. The second interview guide targeted to the key informants was not translated and these interviews were conducted in English except for the interviews with the Water Point Committee representatives. They were interviewed in *Oshiwambo*.

3.3.1. Interviews

1. To examine how water is accessed and determine what the barriers are in accessing potable water for the communities.

In order to gather information to address objective 1, household interviews were conducted to determine the different barriers for communities in accessing potable water. These interview questions focused on bringing out the challenges associated with accessing potable water among the different social groups (male and female) as well as the costs associated with accessing water. Examples of questions that were asked included: *What is water used for at the household level?, Where this water comes from?, What are the challenges in accessing this water?, What are the costs associated with accessing this water?*

2. To examine how the well-being of the communities in the two villages is affected by water access:

In order to gather information to address objective 2, household interviews were conducted to collect information on the wellbeing of the community at household level, with a focus on how water enables people to meet their needs. More precisely, the questionnaires collected information on how the barriers to accessing water affect their well-being, specifically subjective well-being. To assess 'satisfaction with life' communities of Okalonga B and Onandjandja were asked how satisfied they are with their lives by giving a score of 1 to 5 with 1 being the lowest.

3. To explore how communities are engaged in water governance.

In order to gather information to address objective 3, key informant interviews were conducted with stakeholders at regional and constituency levels who are knowledgeable about water governance in the Cuvelai-Etosha Basin with a focus on the Onesi constituency. The key informants that were interviewed included representatives of water point committees (n=2), traditional authority (n=1) and the directorate of water supply and

sanitation (n=1). The purpose of the key informant interviews was to collect information from people at different scales who have first-hand knowledge about how water is governed in the *Okalonga B* and *Onandjandja* villages of the Onesi constituency and how this affects the availability of potable water at the community level.

Furthermore, household interviews were conducted to collect information on how communities are engaged in water governance. Specifically to determine if they know how water is managed in their area, if they are members of any water related associations, if they participate in workshops or meetings and if they know the channel of communication between them and the different stakeholders.

3.3.2. Data analysis

Themes were determined by listening to the recording and reading the notes that were created during the interviews. This involves categorising the interview data in a broad manner by using the subject areas of the interview as a guideline. These themes were then systematically entered into an excel spread sheet. Once the themes were entered, a 1 was given for each person that mentioned the theme. These were then added up after which the graphs were created in excel. Subthemes that were repeated were also identified. In order to showcase the themes more distinctly, quotes from individuals will be used (Roberts et al., 2006) in chapters 4 and 5.

To assess 'satisfaction with life' communities of Okalonga B and Onandjandja were asked how satisfied they are with their lives by giving a score of 1 to 5 with 1 being the lowest. An average of these scores was calculated in Excel and presented in Chapter 4.

3.3.3. Limitations

Although the aim was to include as many stakeholders as possible and to ensure that there was a good representation of participants from the two villages, certain constraints such as the time it took to secure interviews did not allow for this. In addition, it was not possible to

engage with an even representation of males and females, and different age classes. This also resulted in a small sample size. Furthermore, the time of year in which the interviews took place was challenging as many different events were taking place that required the attendance of government officials and that of community members. This meant that few individuals were in their homesteads or offices at the time of data collection.

3.3.4. Ethical considerations

An ethics proposal in line with the ethics policy of the University of Cape Town was submitted for the ethics committee's consideration and approved. The interviewer introduced herself, stated the reason for the visit as well as introduced the project to the participants. Participants were then allowed to ask questions before the interview began. Consent for audio recording was sought before the interview started. The participants were told that they will remain anonymous. Their audio files also remained anonymous as they were labelled numerically. No names were used.

Chapter 4: Water access, barriers to accessing potable water and their implications on the well-being of the communities in the Okalonga B and Onandjandja villages

This chapter outlines the different water sources in the two villages and provides a description of how water is collected. It then compares and discusses the different modes of accessing water in the two villages based on results from the community members that were interviewed. It further investigates the barriers to accessing potable water as well as how these barriers affect the well-being of the communities in the study site. The chapter also investigates the ways in which potable water can be made more accessible to the communities.

4.1. Water sources

A variety of water sources (Figure 5) are used by the communities of the *Okalonga B* and *Onandjandja* villages. These consist of Etaka dam (n=11), hand-dug wells (n=17; Okalonga B:11; Onandjandja: 6), boreholes (n=4; Okalonga B: 1; Onandjandja: 3), private taps (n=5; Okalonga B: 1; Onandjandja: 4) and communal taps (n=2; Okalonga B: 0; Onandjandja: 2). All the participants (n=20; Okalonga B: 12; Onandjandja: 8) from the two villages obtain water that they use from a combination of different water sources. This is dependent on a variety of factors such as a well drying up, a tap breaking, a borehole closing and so forth. For example one participant was quoted saying "*I usually get water from Etaka* [dam] *but sometimes it dries up, especially during the dry season or when there is a drought. When this happens, I use the nearest hand-dug well that belongs to my neighbour.*"

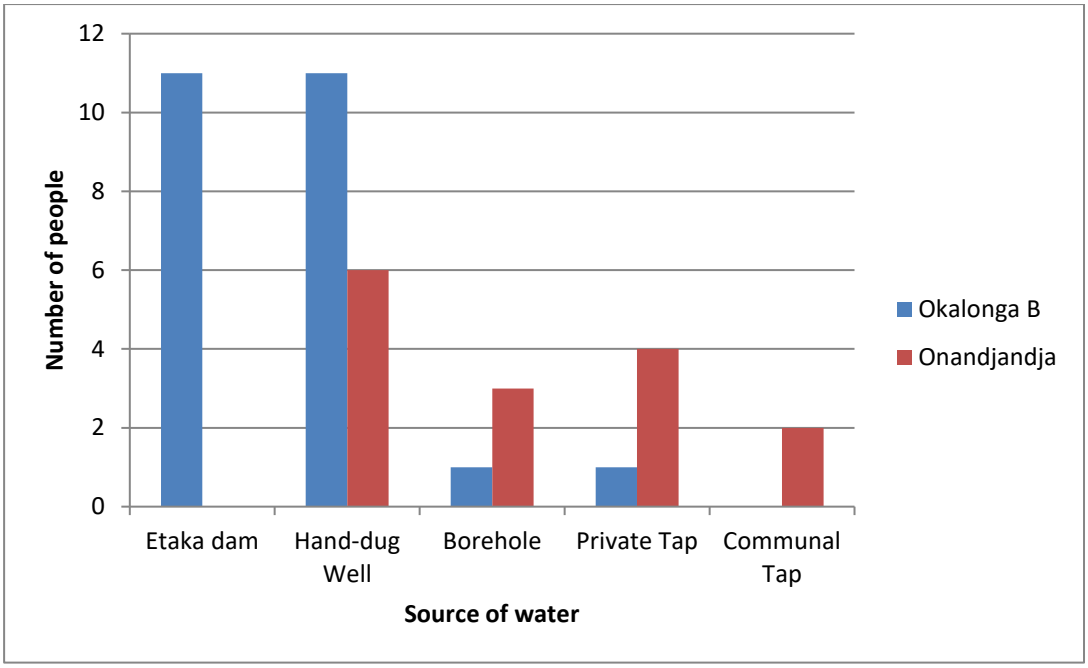

Figure 5.Where people collect water from in Okalonga B (n=12) and Onandjandja (n=8). A total of 12 females and 8 males were interviewed.

4.2. Collection of water

All respondents mentioned that the water they collect is used for household activities such as cooking, cleaning, bathing as well as for consumption by both people and livestock. According to Crow and Cruz (2001) water is generally used for different human purposes with particular requirements as well as characteristics. Drinking and cooking needs clean water with levels of low bacterial contamination as well as low levels of mineral toxicity. Washing and bathing requires water that is clean as well as a sense of privacy (for bathing). Small-scale irrigation (such as kitchen gardening) requires a reliable source of water that is adequate and free from bacterial or mineral contamination.

People use various containers such as buckets, bottles and basins to collect water. They also use various methods of transport including the use of donkey carts (n=13), bicycles (n=1) and wheelbarrows (n=9). All the participants that were interviewed indicated that they walk to the water source at one point or another which is similar to villages in most African countries. Generally women and children spend a considerable amount of time walking to the water source in order to collect water (Sullivan et al., 2013). Due to the low employment

rate of the Omusati region, many of the inhabitants are not able to afford a vehicle for transporting water or to buy large containers for storing water. They would, therefore, have to walk to and from the water point with containers they are able to carry.

4.3. Modes of water access in Okalonga B and Onandjandja

This section discusses the modes of water access in Okalonga B and Onandjandja as listed in the Table 2 below:

Table 2. Modes of water access in Okalonga B (n=12) and Onandjandja (n=8).

Modes of water access identified by Crow and Cruz (2001)	Examples in the two villages	Okalonga B (n)	Onandjandja (n)
1. Private ownership	Private taps Hand-dug wells Etaka dam	1 11 11	4 6 N/A
2. Common property with communal rights	Communal taps Etaka dam	0 11	2 N/A
3. Open access	Oshana	Observed by author	Observed by author
4. State-backed	Communal taps Etaka dam Boreholes	0 11 1	2 N/A 3
5. Market access	Private taps	1	4

4.3.1. Hand-dug wells

Hand-dug wells are the most commonly used source of water in both villages (n= 11 in Okalonga B and n=6 in Onandjandja, Figure 5). The first mode of access which is private ownership (Table 2) can be applied to hand-dug wells that are found on someone's private property as they are owned by those responsible for digging them (Werner, 2009). These

wells are treated as private property in the two villages because they were dug by the individual owners of the property on which the wells occur and access is regulated by the owner. All the 17 people that said that they use hand-dug wells have indicated that the water from the wells is “dirty” and that they often fall sick after drinking the water. They further indicated that they have to get purifying medication from the clinic. This resonates with literature as a study conducted by CuveWaters (n.d.) in the same region has shown that these hand-dug wells are contaminated with algae, faeces and parasites can be high and can, therefore, impact the health of those that drink from it with children being most susceptible. One respondent was quoted saying: *"The water from the well is very dirty. Sometimes it is yellowish. When it is too dirty I have to get water from iishana because it looks better."Iishana* (plural of oshana) are shallow depressions that are seasonally inundated with water during the rainy season (Mendelsohn et al., 2013). With regards to purifying water, another respondent said:*"In the past we needed to get medicine from the local clinic in order to make the water clean enough for drinking. Sometimes this medication is finished. Now we no longer get the medication, we try to boil the water first before drinking it but you can still see the dirt. What can we do but drink it?*"

4.3.2. Private and communal taps

The first mode of access (Table 2) also applies to community members that have private taps in their homesteads as they have a privately owned pipeline system that provides them access water in their homesteads. Of the 20 participants that were interviewed, only 5 people (4 from Onandjandja and 1 from Okalonga B) have private taps of which 1 indicated that she has neighbours that use her tap at a price and another indicated that he knows of people that do not have private taps and purchase water from the neighbours who have private taps. This purchasing of water relates to the last mode of access; the ‘market access’ which refers to the purchasing of water (Table 2). This mode of access occurs between individuals with private taps and those without private taps in the two villages. The individuals with no tap purchase water from those with taps such as those in the two villages.

Another mode of access is 'state-backed provision' and refers to accessing water through a government funded project such as municipal tap water (Crow and Cruz, 2001). The communal taps in both villages fall under this mode of access (Table 2). None of the participants interviewed from Okalonga B obtain water from communal taps and only two participants from Onandjandja indicated that they have access to communal taps (Figure 5). This means that the majority of the respondents of the two villages do not have access to potable water as they rely largely on water sources that are not considered safe for human consumption. According to Crow and Cruz (2001) villages or areas that are remote generally only have access to unsafe water that is not sufficient enough to sustain potential livelihoods such as irrigated agriculture. This seems to be the case in the two villages as all of the people that were interviewed did not practice irrigated agriculture. In the Omusati region 80.5% of the residents named small-scale farming as their main income source, according to the Household Income and Expenditure Survey (Newsham and Thomas, 2010). A review of participatory poverty assessments conducted in a few African countries showed that the supply of potable water was considered a priority by the communities (Booth et al., 1998). Similarly, the respondents from the Okalonga B village considered having potable water a priority as they referred to a communal tap that was never installed after the trench for its pipeline was dug in 2013. These respondents mentioned that the opening of this tap may improve the livelihoods of this community through small-scale irrigated agriculture as they could pump water directly.

4.3.3. Etaka dam and Oshana

In Okalonga B, the Etaka dam is the second most commonly used source of water (n=11) but is not used by the communities of Onandjandja. *The Etaka dam falls under the second mode of access (common property with communal rights) in terms of the community's access to water. It however also falls under the first mode of access (private ownership) as it is the private property of NamWater (Table 2).*

The third mode of access is 'open access' which is an unregulated form of access to a common resource (Crow and Cruz, 2001) such as the *Oshana* in both villages (Table 2). These water sources were not referred to by the respondents but were observed by the author in both villages and are a prominent feature of the region especially during the rainy season.

4.3.4. Boreholes

Boreholes do not seem to be a common source of water for the communities of both villages as only a total of 4 (1 person from Okalonga B and 3 people from Onandjandja) respondents indicated that they use boreholes as a source of water. This could be because boreholes were set-up for use by wildlife and livestock especially during droughts, and not for domestic use (Werner, 2009). The boreholes are generally installed in cattle-posts which are usually far from the homesteads as they are used by livestock and wildlife. The boreholes in both villages fall under the fourth mode of access (Table 2), 'state-backed provision', and refer to accessing water through a government funded project such as municipal tap water (Crow and Cruz, 2001). Boreholes are government funded.

4.4. Effect of distance to district capital (Onesi) on accessing potable water

The Traditional Authority office indicated that generally villages close to Onesi, the district capital of the constituency, have more access to potable water whereas more remote villages have less access to potable water and therefore rely mostly on hand-dug wells or iishana which are shallow depressions that are seasonally inundated with water during the rainy season (Mendelsohn et al., 2013). The reason for this (as explained by the Traditional Authority office) is that it is more cost effective in terms of labour and money to connect other pipelines to the main pipeline because the distance is shorter. This was evident in the constituency as more communal taps were observed the closer one was to the district capital (Onesi). Moreover, households that have investments in resources such as irrigation equipment have more income and can afford to pump water directly (Crow and Sultana,

2002) from the main pipeline. This water is generally clean and reliable. According to Cruz and Sultana (2002), property relations also play a role in one's ability to access potable water – people without land or investments are excluded as they cannot afford to purchase infrastructure to pump water directly to their houses.

4.5. Barriers to accessing potable water

A total of 6 barriers to accessing potable water were determined by the respondents when they were asked to name what the barriers are for them in accessing potable water (Table 3). The most common barriers that were mentioned were "amount one can carry" (n=18, 90%), "distance to the communal tap" (n=18, 90%) and "administration and maintenance of water infrastructure"(n=18, 90%) whereas the least common barrier was "time allocation" (n=6, 30%). Females (n=11, 60%) reported more concern around broken infrastructure than males (n=3, 15%). There was also a notable difference between females (n=4, 20%) and males (n=2, 10%) that indicated time allocation as a barrier as well as broken infrastructure.

Theme	OB	ON	Female (n = 12)	OB	ON	Male (n = 8)
	n	n	Illustrative reasons	n	n	Illustrative reasons
Amount of water one can carry(*discussed under distance to communal taps*)	6	4	*"We are unable to carry sufficient water for all activities as we do not have a car nor a donkey kart. We need to make several trips to the dam which takes up time that we could use for other activities"* *"I am able to get enough water but I am thinking about the old people and those that do not have donkey carts or wheelbarrows. They cannot carry as much water as they need."* *"I cannot carry a lot of water at one go. I need to make many trips during the day to get water. This sometimes means that I do not have enough time for my other activities."*	5	3	*"It is difficult for the elderly to fetch enough water as we are unable to carry many buckets or buckets that can take large quantities. So we have to make many trips"* *"The elders cannot carry as much water as they need due to their physical inability"* *"Old people and the disabled ones cannot carry a lot of water. They have to send the children who can also only carry small containers."*
Distance to communal taps	6	4	*"The taps are very far from us which is why we use the dirty water from Etaka"* *"It is difficult to carry a bucket on the head for a long time but what must we do. We need the water."*	5	3	*"Elders have to send the children as they cannot travel that long distance"* *"Distance is far. Those of us with wheelbarrows have to assist the elderly."*
Maintenance of water infrastructure	6	5	*"We cannot get clean water when tap is closed after it breaks"* *"The handles and chains at times break. When this happens they go to the iishana to collect water."* *"Sometimes the pipes burst and the borehole sometimes breaks as well. We have to fix our own pipes but the government needs to fix the borehole if something big broke."*	0	3	*"You will find that the taps are sometimes broken and there is no one to fix them because we do not know how. It also takes a while for the government to send someone that can fix it"* *"The tap sometimes breaks and we will have no water for days until it is fixed. When this happens we have meetings with the committee and there we decide how to pay for it."*
		4	*"Committees sometimes are not organised. They sometimes come late to open the tap and we have to wait for them"*	5	3	*"Committee members have quit in the past resulting in the taps not being used"*

Table 3. Barriers to accessing potable water in Okalonga B (OB, n=12) and Onandjandja (ON, n=8).

Administration of water infrastructure	6		*"There have been committees that quit because they got jobs or they became too busy to also look after the communal tap."*			*"There have been borehole committees that quit. After that the borehole cannot be used until someone else volunteers."*
Money	2	3	*"We pay N$500 per year to use the borehole whether or not you have livestock. This is too much money. My grandmother pays this amount from her pension otherwise we have to use the well"* *"I would have my own tap in the house if I had the money but now I cannot afford it."*	4	3	*"Sometimes when I can't afford to pay, I use water from the wells. Other people use the wells to save the money they would have used for tap water"* "When we do not have money to pay we use the well. What else can we do?"
Time allocation	2	2	*"I can only fetch water at specific times. I cannot just go when I feel like it. This would not be the case if I had my own tap"* *"I can only get water three times a day. These are the times we agreed on. I would like to be able to collect water at any time. This way I know I have enough water everyday."*	0	2	*"I can only get water three times a day at the specific times that were agreed on"* *"I cannot fetch as much water as I would like to because of the times that have been put up. I know it is what we agreed on but it is still difficult to only collect water at certain times."*

The different barriers have been discussed in more detail below:

4.5.1. Administration and maintenance of water infrastructure

4.5.1.1. Administration of water infrastructure

Respondents from both villages have indicated poor administration and maintenance of water infrastructure by the Water Point Committee; 18 respondents indicated that the communal taps are poorly administered by the water point committee whereas 14 respondents indicated that the maintenance of the water infrastructure was poor (Table 3). In Onandjandja, the respondents mentioned that when they collected water from communal taps they would find that the Water Point Committee responsible for opening and closing the tap would come late resulting in people having to wait in long queues. They further mentioned that Water Point Committee members would often quit which results in the taps being closed until a new member is elected or volunteers to take over. Community members are then forced to collect water from contaminated water sources or walk long distances to the nearest communal tap within the village. Having no committee members attending to the taps also means that the infrastructure is left to deteriorate resulting in the need for additional funds to fix it. When the two Water Point Committee members were asked about the challenges they face, they indicated that it is sometimes difficult to remain on the committee as it is a voluntary position that takes up a considerable amount of time. *"This job looks easy but it takes up a lot of my time and I am not paid for it. When I am here [at the tap], I cannot do anything else. Sometimes people quit because they have need to make money in order to survive."* – This was a quote from one of the Water Point Committee members that were interviewed. They both indicated that this is time they could spend on income generating activities such as "selling vegetables". One of them was quoted saying: *"I could be selling my vegetables instead of opening and closing the tap. I do it because my people [other community members] and I need the water."* In fact when this Water Point Committee member was interviewed, she was on her way to Onesi to sell vegetables.

Committee members are, therefore, forced to quit their job as committee members because it does not create any income or incentive for them to remain and carry out their duties.

This is a challenge that is not addressed by the CBM policy. Furthermore, the CBM policy does not make provision for committee members to be paid. The policy indicates that the newly formed water associations had to share the costs of providing water (Schnegg & Bollig, 2016). This can be seen as a weakness of the policy as it threatens its sustainability because of committee members continuously quitting their jobs. This cycle of committee members quitting their jobs questions the sustainability of the strategy currently in place as it assumes that community members have the time, capacity and enough incentive to be the administrators of their communal taps. Lind (2002) has raised similar concerns regarding projects that devolve responsibility to communities. Lind (2002) further argues that projects that try to broaden and deepen the participation of communities in resource management by shifting responsibility from the state have the idea that community members have the time, the ability and the responsibility to manage resources. Furthermore, Kulipossa (2004) and Prokopy (2004) argue that decentralising responsibilities does not necessarily lead to the success of the project nor does it improve the management or the sustainability of the project. What decentralisation of water resource management can do (if not implemented properly) is place the burden of ensuring service delivery that is effective and progressive change on marginalised and poor communities (Gonzalez de la Rocha, 2003).

This can be seen with the current strategy of community members managing water infrastructure as it appears to be a burden on the communities regardless of the benefits it brings to them. It could be because they have not been provided with the necessary resources and capacities in order to be able to effectively play out their roles and responsibilities. Cornwall and Gaventa (2000) have noted that there is a particular need for the state to pay more attention to the capacity of communities in their ability to assume governance roles because the devolution of responsibility often shifts from the state to the communities without them being given the necessary resources and capacities (also noted in Fergusan and Malwafu, 2001). Furthermore, a policy that assumes that passing

responsibility for water management to the communities without making sure that there are mechanisms in place to ensure that these communities are held accountable cannot be considered effective (Cleaver and Toner, 2006). The Directorate of Rural Water Supply has indicated that *"there is often not enough manpower or funds to ensure regular trainings for committee members or ensure effective and continuous monitoring of all the communal taps."* They further indicated that there are not enough funds to pay the committee members. It can also be argued that that the poor administration of water infrastructure by the Water Point Committee members could be a result of the poor incentive provided for them while taking up these voluntary positions. Water Point Committee members may not be giving their job full attention as they may be involved in other activities that give provide them with the necessary income A study conducted by Falk et al. (2009) has shown that additional financial burdens are created when economic responsibility is put in the hand of the users. This burden is difficult to carry, especially by the poor as they already have their own financial burdens (Falk et al., 2009). This frustration could be sensed when the interviewed Water Point Committee members said that they could be using their time to conduct other activities that can earn them an income. As a result they quit the voluntary job of taking care of the communal taps.

4.5.1.2. Maintenance of water infrastructure

Both villages had respondents that indicated that they have experienced a broken tap or borehole when collecting water. A total of 6 people indicated broken infrastructure as a barrier to accessing potable water in Okalonga B. All of these respondents were female. All of the respondents in Onandjandja indicated broken infrastructure as a barrier to accessing potable water. These community members explained that when a tap or borehole is broken they have to get water from the nearest water source, which is usually a hand-dug well or *iishana* or for the communities of Okalonga B, the Etaka dam. All of these sources, as mentioned previously, have contaminated water. Moreover, the broken infrastructure is not fixed immediately because the mechanic who has been trained to fix minor issues is unavailable or there is no money to replace the broken material. In other cases such as when

it is a major issue and cannot be fixed by the community, the government often takes too long to assist because of funding constraints. This can result in taps or boreholes not being used for months which can cause the strategy currently in place to be viewed as having failed.

It was also interesting to note that more women than men indicated broken infrastructure as one of the barriers they face in accessing potable water (11 females and 3 males). It could be assumed that this is because collecting water is usually the women's responsibility and they would therefore notice if a tap or borehole is not working as it means that they would have to go collect water elsewhere. Collecting water elsewhere might mean that they get to spend less time on chores if the water source is further or they may have to do additional chores such as collecting firewood in order to boil the water, if it comes from a contaminated source. Crow and Sultana (2002) have found that water collection constitutes a significant part of a woman's work in the rural areas of developing countries, and that it takes up a considerable amount of their time.

The current strategy of managing water supply aims to involve communities in the governance and management of their water resources which is a critical aspect in rural water governance. It is also important for empowering the rural communities by transferring the responsibility of water resource management to them. It is, however, important to ensure that sufficient tools and knowledge is also transferred to the communities in order for them to effectively take care of the infrastructure. Fergusan and Malwafu (2001) consider community-led projects as 'destined to fail' if communities are not given *"sufficient resources or knowledge"*. They gave an example of a project in southern Africa that was close to collapsing after the state handed the communities irrigation infrastructure without given them neither the resources nor imparting the knowledge to maintain the infrastructure. In another case, communities in Sierra Leone could not maintain hand pumps after they were given the responsibility by their government to manage them. What this community lacked were the funds and capacity to manage the pumps (Margrath, 2006) which is similar to the situation in Okalonga B and Onandjandja.

Margrath (2006) further argues that the Sierra Leone example follows neoliberalised tendencies where the local actors are given responsibilities but without the power, neither the tools nor the resources needed for effective management. This type of transfer of responsibilities does not empower communities at all (Harris, 2009). Instead it makes them feel inadequate and perhaps hopeless which discourages them in participating in the management of their water resources. Remmert (2016) in his study on water resource management in Namibia has noted that communities are faced with financial and management challenges in administering and maintaining their water infrastructure. Remmert (2016) also noted that water supply security continues to be a problem for the communities.

4.5.2. Distance to communal taps

Community members from both villages indicated that distance was a barrier to accessing potable water as illustrated in Table 3. The distance to a communal tap is 2.5 km according to the CBM policy. A total of 11 respondents (6 females and 5 males) from Okalonga B said that distance was a one of the reasons they could not access potable water and obtain water from the nearby contaminated water sources. This was found to be the same for 7 respondents (4 females and 3 males) of Onandjandja. The Traditional Authority office also stated that the distance between communal taps is big which means communities have to travel long distances of up to 10 km, with buckets on their heads, to get potable water. This is because there is not necessarily a communal tap in every village. If there were communal taps in every village, the travel distance to collect water would be reduced to 2.5 km as indicated in the CBM policy. The Traditional Authority representative further stated that the troughs for the livestock are not enough as some livestock have to travel up to 20 km to reach water. The distance also affected the amount of water people can carry to and from the water point, and the time it takes to collect water. The Directorate of Rural Water Supply indicated that there are also communities that are far from the communal taps because when the feasibility study was done, the homesteads had not been erected.

The vast majority of people in the two villages do not own vehicles as they cannot afford to. They, therefore, use other methods of transport such as donkey carts, bicycles and wheelbarrows. All the participants that were interviewed indicated that they have walked to a water point at one stage. When walking, they use smaller containers such as buckets, bottles and basins to collect water which greatly affects the amount of water they can carry and therefore use. The water they are able to carry in these small containers is usually not sufficient for their daily needs. They would have to make several trips to the water point or have several family members collect water including the children. This is an indication that a great deal of time is spent collecting water. The literature also shows that communities in rural areas do generally spend a lot of time collecting water because of the distance of the water source in relation to the house. Kyessi (2005) states that much productive time may be wasted in search for water, especially for women and children (Kyessi, 2005).Furthermore, a study conducted by Sullivan et al. (2003) in poor urban communities in Sri Lanka showed that the amount of time it takes to collect potable water because of the distance played a significant role in the communities' ability to access potable water. Like in Okalonga B and Onandjandja, communities would opt for contaminated water sources instead because they are closer.

Distance to communal taps seems to affect the elderly more than the other age groups in both villages. This is because the older people are physically unable to walk to the communal tap and back with containers of water. They would therefore rely on their neighbours to assist them with collecting water if they do not have any children or youth in the homestead. The Traditional Authority office also stated that *"in most cases the elderly are unable to access potable water because it is physically impossible for them to walk the long distances whilst carrying a container."* They, therefore, have to send children or youth for water or send the neighbours (*"if they have good relations"*).These good relations can refer to those that have been formed between people who know each other well through years of interaction. These people can be family members, neighbours and members of primary groups such as ethnic groups (Babaei et al., 2012). For example one of the respondents in this study said that they often assist their elderly neighbour with collecting

water. This respondent sends the children in the house to collect water for the neighbour or they collect additional water in order to assist the neighbour. This type of setup illustrates the importance of social networks in the community as they play a critical role in water access (Jordan, 2015).

4.5.3. Money

As illustrated in Table 3, respondents from both villages indicated money as one of the barriers to accessing potable water. A total of 6 respondents (2 females and 4 males) in Okalonga B and 6 respondents (3 males and 3 females) in Onandjandja indicated that they cannot afford to pay for water. Similar reasons were given in both villages as to why they cannot afford the water fees; these were unemployment and the additional costs required to reach the tap such as transport costs. Another reason, for especially, the elderly was that the pension they receive is used for buying school uniform, food, ploughing and taking care of the grandchildren. Paying for water, therefore, becomes an extra expense that they cannot afford. The Directorate of Rural Water Supply also indicated that *"there are communities who cannot afford to pay for potable water because of a lack of income."*

Communities in Tanzania are also expected to pay for the full cost of operation and maintenance of their water infrastructure (Winpenny, 1994; Roger et al., 2002). The Tanzanian government recognises water to be a basic human right but it does not address the needs of the poorest and most vulnerable groups (Winpenny, 1994; Roger et al., 2002). These groups appear to be a homogenous group in terms of their ability to pay the user fees. This resonates partially with the CBM strategy in that water is seen as an economic good which communities are expected to pay for (Republic of Namibia, 2008). The difference is, however, that the rural communities are not seen as homogenous by the Namibian government; the need to assist vulnerable and marginalised groups has been recognised according to the Traditional Authority office and the Directorate of Rural Water Supply. The CBM policy does not make provision for assisting vulnerable and marganilised groups but vulnerable and marganilised groups are recognised by the government and usually receive

assistance where possible. The Traditional Authority and the Directorate of Rural Water identify these vulnerable and marganilised groups through surveys. Ideally, a separate fund has been set aside to assist vulnerable and marginalised groups in accessing potable water through a rigorous application process. The Traditional Authority representative was quoted saying that there are, however, no funds available to currently assist these groups although there have been cases where communities have been assisted in the past (Traditional Authority and Directorate of Rural Water Supply, personal communication).

The Omusati region was found to be the third most deprived region in terms of employment according to the National Planning Commission report (2011). This means that there are a large number of unemployed people in the region which could explain why 12 out of the 20 people that were interviewed cannot afford to pay for potable water even though this water has been heavily subsidised by the government to ensure it is affordable to the rural communities (Republic of Namibia, 2008). This inability to pay for potable water has had negative implications for the communities of the two villages. It has resulted in some members obtaining water from contaminated water sources such as hand-dug wells and *oshana* even though they have a communal tap in reasonable proximity from their homestead. For example, one of the respondents from Onandjandja indicated that she knows of individuals in the village that are located near a communal tap but would choose to use hand-dug wells because they cannot afford the payments required to use the communal tap.

An increase in inequality is another implication that could result from some community members' inability to pay for potable water. The community members that are able to pay may be seen as elite by those that cannot afford the cost of water. This may result in this system being seen to favour only these 'elites' and not everyone in the community. This is despite the fact that according to the CBM strategy, the members of the Water Point Association decide the method of payment under the supervision of a government representative or appointed NGO (Republic of Namibia, 2008).There are generally two recommended methods of payment; a rate per head of small or large livestock where each

member pays according to the number of livestock drink at the water point. The other payment method scheme is equal payment where equal contributions are required for all homesteads or individuals. This payment method is usually for covering the cost of domestic use (Schnegg, 2016). Seven communities in the Kunene region of Namibia, however, adopted a different paying method after realising that the two recommended methods of payment were not working, and that imposing sanctions created conflict amongst the communities which caused further division. They used a method in which the rich paid more than the poor (Schnegg, 2016). Apart from reducing conflict, this form of payment was also created in an effort to make the accessibility to water easier and fair.

The community of Onandjandja have, however, opted for another option that has not been recommended, which is to pay for the amount of water collected as per the tariff that is set by NamWater. When collecting the water, a member of the Water Point Committee records the details of the individual as well as the amount of water the person has used according to the water meter. This amount (in m^3) is then multiplied by the set tariff and paid to the treasurer of Water Point Committee at the end of the month who then pays NamWater. Failure to pay can result in access to water being denied as part of agreed upon sanctions. Critics do, however, worry about the transfer of costs to low income households. This type of system puts another financial burden on already poor people (Jaglin, 2002). This can be seen with the communities of Okalonga B and Onandjandja who cannot afford to pay for water resulting in them not having access to potable water and using contaminated water instead.

4.5.4. Time allocation

According to the CBM strategy, specific times are allocated for when to collect water from communal taps, which is referred to as “time allocation” in this thesis. These times are agreed upon by the water users and their water point committee. In Onandjandja, the tap is opened three times a day for an hour each time. During this time the community members are allowed to collect water. There is no access outside of these times because

the tap is closed and the responsible water point committee has the key. A total of 4 people (2 females and 2 males) indicated that time allocation is a barrier for accessing potable water. This is because they can only access water at given times which means that they often do not obtain sufficient water for their daily needs. It is even more of a challenge for those that do not have vehicles or donkey carts as this means they can only carry a limited amount of small containers and cannot make several trips to the tap. Community members would, therefore, opt to collect water from other sources during the period that the taps are closed. They do, however, use this water for non-consumptive purposes such as washing and bathing, and in some cases for cooking because the water is boiled in the process.

Time allocation has been put in place as a measure to regulate and control the use of the communal taps. It has also been put in place because the person responsible for opening and closing the tap works on a voluntary basis. This means that the responsible person cannot be at the gate on a full-time basis. This issue may be corrected if the CBM policy made provision for payment of the volunteer.

4.6. The implications of poor access to potable water on the well-being of communities in the Okalonga B and Onandjandja villages

It has been determined that communities of Okalonga B and Onandjandja use water from contaminated sources as a result of the different barriers they face to accessing potable water. Nineteen respondents from both villages have indicated that they sometimes get sick after drinking water from these sources. One respondent from Okalonga B was quoted saying: *"The borehole water is not very clean. It sometimes gives us diarrhoea after we drink it."* A respondent from Onandjandja said: *"The water from the well is very dirty. It sometimes gives us stomach aches and diarrhoea especially when we go away and come back."* There seems to be a clear indication that the health of these communities is negatively affected by their inability to access potable water. This is not surprising because according to Kyessi (2005), there is evidence that water-borne diseases are most common in places where people use contaminated water or in places where people have a limited amount of water

for their daily use. Water-borne diseases threaten the health of people that contract them (Kevany and Huisingh, 2013). Illnesses that can be contracted from water-borne diseases include gastrointestinal illnesses that result from ingesting water that has been contaminated by bacteria and faeces (Kevany and Huisingh, 2013).Contracting these illnesses can have negative ripple effects such as women not being able to work on their chores or being able to take care of their children as a result of being sick. Children tend to be most susceptible to the effects of contaminated water (CuveWaters, n.d.). The implications of this could be that children are forced to miss school as a result of falling sick from drinking the contaminated water or from assisting their parents with collecting water.

This puts pressure particularly on women who worry about using water that is unsafe and unreliable as they fear themselves or their household members contracting water-borne illnesses. Accessing water already demands time and puts pressure on households (Kevany and Huisingh, 2013). Accessing contaminated water would, therefore, put more pressure on families and can indirectly cause tensions among family members because money might have to be spent on obtaining medicine for the sick as well as on transport to get to the clinic. This puts extra financial burden on an already poor household which lowers their well-being due to stress caused by economic insecurity. According to Stevenson et al. (2012), there is a positive correlation between stress and water insecurity. The same author found that women who had higher water insecurity experienced more symptoms that can be attributed to poor mental health.

Being sick might further affect the productivity of communities' subsistence farming activities because these activities require one to be fit and strong. These communities depend heavily on subsistence farming for their livelihoods and well-being as it provides them with food and in some cases money (Werner, 2009). This is further perpetuated by the onset of severe droughts. According to multiple sources, people (especially women) are forced to travel further in order to gain access to water. This reduces their time for other household chores and work on their land. Moreover, they will have less time to participate in activities outside of their homesteads (Kyessi, 2005; Tandon, 2007; Angula, 2010).Men are

also forced to leave their homes in search of water for their livestock (Angula, 2010).A possible case of low happiness can result from a situation where individuals need to leave their homes in order to obtain water (Guardiola et al., 2011). Guardiola et al. (2011) further hypothesises that the strain on people's well-being becomes more as the distance to water sources increases. This could be seen with the communities of Okalonga B and Onandjandja as they seemed to not entirely be satisfied with their lives due to their poor access to potable water.

4.6.1. Satisfaction with life

One of the ways to assess subjective well-being is by determining people's satisfaction with life. Chambers (2013:193) describes well-being as the 'experience of good quality of life'. What is meant by a 'good life' depends on culturally-specific meanings, values and beliefs (Blackmore, 2009). The communities of Okalonga B and Onandjandja were, therefore, asked how satisfied they are with their lives by giving a score of 1 to 5 with 1 being the lowest (Figure 6). The average score for Okalonga B was found to 2.58whereas the average score for Onandjandja was 3.25.Participants from both villages seem to be moderately satisfied with their lives. The responses from the participants gave a clear indication of what they considered important. This included clean water nearer to the homesteads, a reliable source of income, family and spiritual believes.

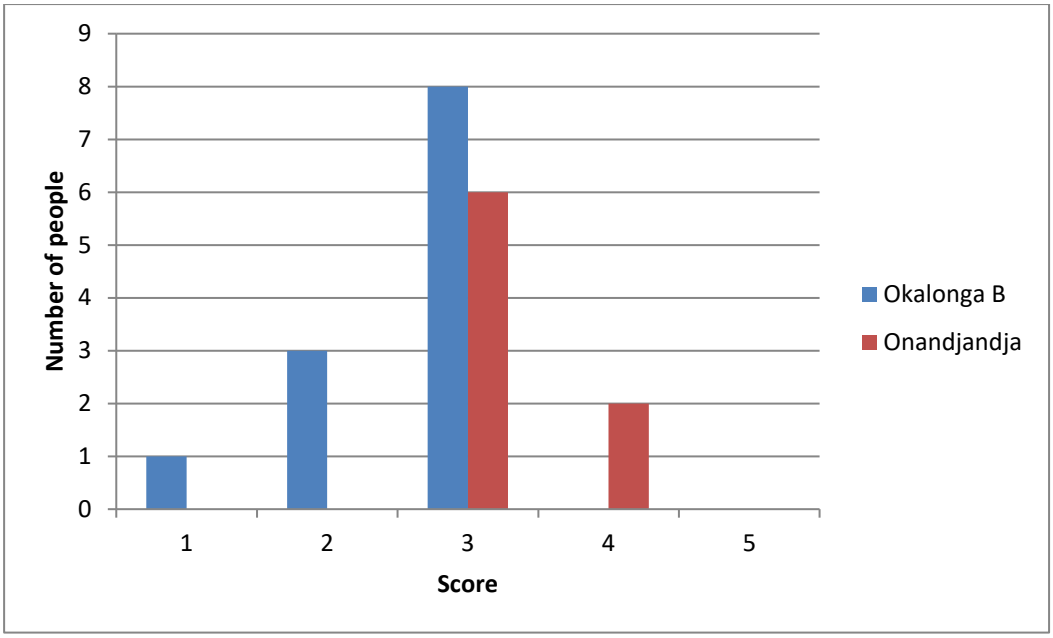

Figure 6.The total scores indicating how satisfied the respondents from Okalonga B and Onandjandja are with their lives. A total of 20 people were interviewed of which 12 were from Okalonga B and 8 were from Onandjandja.

The following quotes were taken from the participants of **Okalonga B**:

"*I am not very happy with my life because I have no job. If I had water closer I could start projects like brick-making and sell the bricks in order to make my life better. Now I am just at home doing nothing*" (score 2).

"*I would be happier if I had clean drinking water in the house or close by*" (score 3).

The following quotes were taken from the participants of **Onandjandja**:

*"I am satisfied with life now that I have water. It used to be very difficult when I did not have water in the house. I used to walk a long distance with the bucket on my head. I was tired before I even got to the tap. Also during the ploughing season, I had to collect water early in the morning before I start ploughing."*This respondent has piped water in their homestead (score 4).

"God has been good to me. I have enough food to eat, I have a house and I have water. What more can I ask for?"(score4).

The quotes above suggest that different people require different things to live a good life or to be satisfied with life. These same quotes further suggest that some people are content and happy if their basic needs such as food, water and shelter are met. The quotes also suggest that their satisfaction in life goes beyond material aspects but is also spiritual. This is in line with literature that illustrates that being satisfied with life is more related to achieving goals (Copestake and Camfield, 2009). A high life satisfaction can also be achieved when people feel content with their lives or because they feel reluctant to say that they are not satisfied as it may make them look ungrateful. In Bangladesh, for example, a high life satisfaction score was recorded through a Well-being in Developing Countries (WeD) study. The study showed that people seemed reluctant to say that they were dissatisfied, perhaps because it would be seen as showing lack of respect to Allah (Copestake and Camfield, 2009). This is similar to the culture of Oshiwambo speaking people in Namibia who are predominantly Christian (Kokkonen, 1993) and often perceive being unsatisfied with one's life as being ungrateful to God.

4.6.2. Aspirations

In order to understand why the respondents were not entirely satisfied with their lives, they were asked what their goals or aspirations are in order to live a good life. According to Armitage et al. (2012), determining aspirations and whether or not they have achieved these aspirations can be used to understand why people may or may not be satisfied with their life as it affects their well-being. Well-being is a way of living, a process that has many dimensions in which people live their best lives. This conception provides well-rounded knowledge on how people's actions and aspirations are limited or enabled by societal structures as a result of they do and what they aspire to (Mckay&Velazco, 2007).

A total of 11 aspirations were identified from the 20 people that were interviewed (12

females and 8 males). The majority of the participants aspired to having vegetable gardens (n=17) (Figure 7) whereas only one person aspired to having a chicken farm. All of the aspirations were related to income generation and require a reliable source of water except owning a private tap, clean drinking water, building a better house and giving livestock water during droughts. One respondent was quoted saying: *"The availability of a private tap would allow me to have projects such as a vegetable garden from which I could sell the produce and make some money."* This is a clear indication that the communities of the two villages do not have a reliable income source. It can be assumed that if they had a more reliable income source, they would feel that they are living a more satisfactory life. With more money, they could take better care of their household and send the children to better schools. A study conducted by Kevany and Huising (2013) in south Asia showed that an increase in family income improved their well-being. This increase in income also encouraged young women to take up leadership roles in the community. Another study by Payne et al. (2008) concluded that access to potable water contributed to the doubling of income poor women in rural areas (Payne et al., 2008). Furthermore, Roy and Crow (2004) found that people are not able to accomplish their hopes for their lives when they lack access to water and material resources.

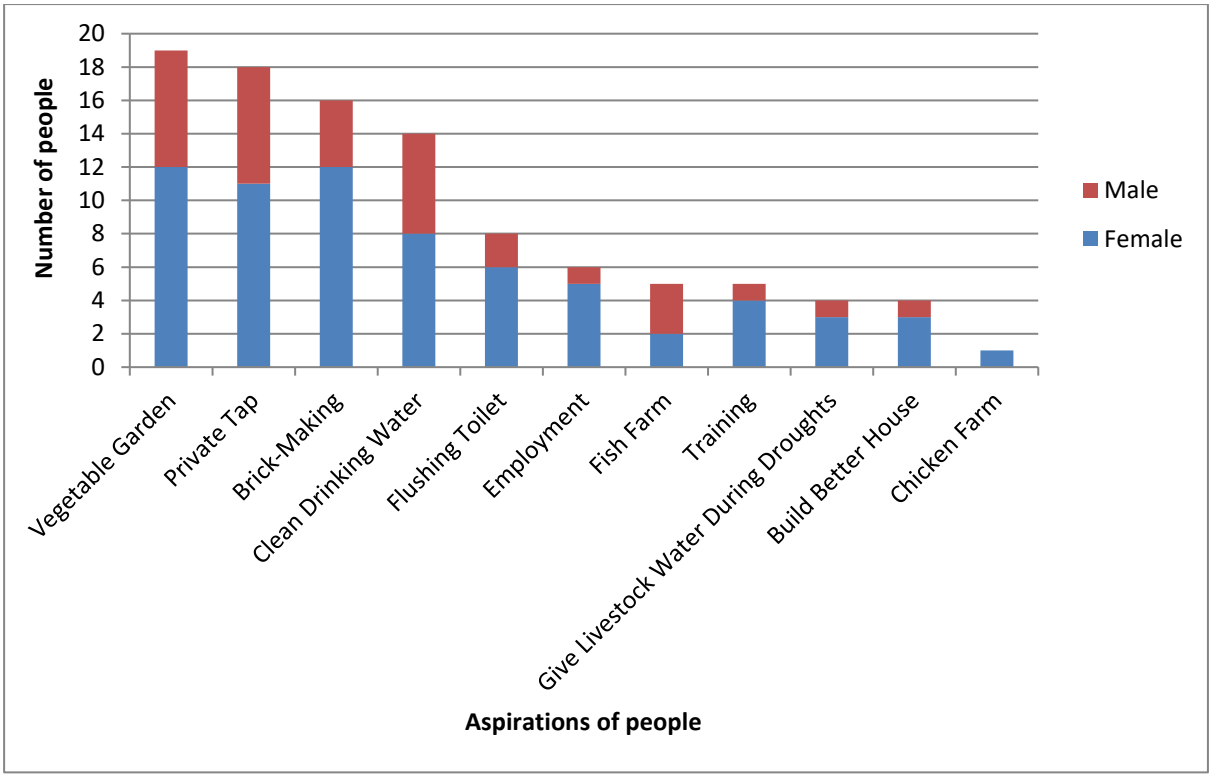

Figure 7.The list of activities that people in both Okalonga B and Onandjandja aspire to undertake. A total of 20 people were interviewed of which 12 were female and 8 were male.

None of the participants interviewed from both villages felt that they achieved their goals or aspirations and are therefore not entirely satisfied with their lives. People generally felt that carrying out the activities they mentioned would improve their livelihoods which would in turn improve their well-being. A total of 4 reasons were given as to why they have not achieved their goals. These were: water (n=15), money (n=2), skills (n=2) and age (n=1). Concerns related to water were the reason given by most people that were interviewed. Of these respondents, 12 felt that the distance of the water source would be the biggest challenge in implementing their income generating activities. The distance would be the biggest challenge because it would require more money to pipe the water to their homestead in order to make water more accessible. On the other hand, two of the respondents felt that the current water source (hand-dug wells and Etaka dam) were unreliable because both these sources have at some point dried up as a result of severe droughts. One of them said: *"Although the water is there, it will not be enough to take care of the projects I mentioned. The wells will dry. It would be better if I had a tap in the house."* The occurrences of severe

droughts are expected to increase because of climate change (Bakker, 2012) which means that water will become scarcer.

Two respondents felt that they could not afford to implement their goals and they would need monetary assistance from the government. One of them said: *"I do not have enough money to pay for the cost that would be incurred with running a vegetable garden."* The employment rate is very low in this region and most people depend on pension, social grant, contractual labour and selling of produce as a source of income (National Planning Commission, 2011). Most people, therefore, do not have a reliable source of income or make enough money to start and maintain projects such as those listed above. Although most of these projects are prominent in the area, it is usually run by people who have permanent jobs in the nearby towns or established business people. It can be assumed that the poorer communities aspire to having similar projects because they can see the wealth that these projects generate. A number of successful horticulture and brick-making projects were observed along the Etaka dam which could be why they were frequently mentioned.

Another two respondents felt that they do not have the necessary skills to run a profitable project and would, therefore, require training. One respondent was quoted saying: *"I don't know how to run these projects or where to start."* Running a profitable business requires the knowledge of certain skills such as financial management. A great majority of communities in rural areas have not gone past grade 12. Furthermore, computer literacy is generally low in these areas. Training would, therefore, be required or else the business or project may be set up for failure. The last respondent felt that he had not met his aspirations because of old-age. He felt that he was physically unfit to implement and run a profitable project, and all his children have left the homestead to start their own families. He could, therefore, not rely on them to run it.

4.7. How access to potable water can be improved

In order to determine ways in which access to potable water can be improved, participants were asked how they think access to potable water can be improved. A total of three

suggestions were given by the 20 people that were interviewed (12 females and 8 males). The main suggestion, which was given by 19 out of the 20 participants, was that the main pipeline that provides water to the nearby villages should be brought closer to their homesteads (Table 4). This was followed by the suggestion that pipelines that have already been dug and installed should be opened (n=12) such as the case for Okalonga B. The last suggested solution was having meetings with the councillor to discuss issues pertaining to accessing potable water (n=7).

Table 4.Suggestions from participants on how access to potable water can be improved. A total of 12 females and 8 males were interviewed.

Theme	**n**	**Female (n= 12)**	**n**	**Male (n= 8)**
		Illustrative reasons		**Illustrative reasons**
The main pipeline should be brought closer to the homesteads	12	*"This will make it easier for us to get water and not use so much time to collect water. Especially during the ploughing season when we need to spend more time in the field"*	7	*"Put up pipeline in the village and each house takes from main supply into their homesteads. This will also help the elderly as they can carry a small container for a shorter distance"*
Pipelines that have been dug and installed should be opened up.	6	*"We dug a trench for pipes nearby in 2013. The pipes have still not been put in the ground. We are still waiting"*	6	*"Trench has been dug, now the pipes just need to be installed"*
Have meetings with the councillor to discuss issues relating to accessing potable water	5	*"The councillor needs to meet with the committee to discuss the our problems"*	2	*"More meetings should be held. This way we can tell the leaders what our problems are and maybe see a change"*

Based on the suggestions that have been given, it is evident that communities would like to have an increase in communal taps closer to their homesteads. Although these suggestions are fair and fully justified, there is an apparent reliance on the government. The country is currently in an economic crisis (New Era, 2016) which means that the government currently does not have the funds to increase the number of communal taps. Furthermore, the government also does not have the manpower to monitor the communal taps that are

currently in place and will not be able to regularly monitor any new communal taps. More innovative approaches to increasing access to potable water need to be encouraged. New collaborations with private sector, NGO's and research institutions could help to access funding from external donors, to reduce the pressure from the government as well as the reliance from the community. Community members of the same village could also work together on community initiated projects such as vegetable gardens or brick-making. Instead of carrying out these income-generating projects individually, this could be done as a village with external technical assistance from other partners. The proceeds from these projects could then be used to add a communal tap to the village. Aladuwaka and Momsen (2010) found that community commitment and shared responsibility for water projects was an important factor for success and improving well-being.

Chapter 5: Community engagement in water governance

The level and quality of participation in water governance has been identified in literature as a facilitator of control and access to potable water. This became evident through this study when the respondents of Okalonga B and Onandjandja mentioned, in the previous chapter, that access to potable water can be improved by having more meetings – one of the ways in which communities can participate in water governance. This chapter is, therefore, aimed at understanding how community members contribute to the management of their water resources and how they are engaged in water governance.

5.1. Understanding how water is managed in Okalonga B and Onandjandja

In order for communities to fully participate in the governance of their water resources, they need to know how their water resources are managed and by which institution(s). Communities of the Okalonga B and Onandjandja villages were, therefore, asked if they know how the water they use is managed and by who.

Table 5.Responses from participants about the management of the different water sources in the two villages. A total of 20 people were interviewed, 12 from Okalonga B and 8 from Onandjandja.

Water source	Officially managed by	Managed by (according to the respondents)	Okalonga B (n)	Onandjandja (n)
Boreholes and communal taps	Water Point Committee (with advice from DRWS)	Water Point Committee	7	1
		NamWater	0	7
Etaka dam	NamWater	NamWater	2	N/A
		No one responsible for management	1	N/A
Hand-dug wells	Self-management	Self-management	2	7

All 12 of the participants from Okalonga B said that they know how water is managed and by whom (Table 5). Seven of the 12 participants said that the water in their area is managed by the Water Point Committee. These participants were referring specifically to communal taps

and boreholes. They said that, based on what they have seen in villages that have communal taps, the Water Point Committee is responsible for ensuring that the taps and boreholes are in good working condition and that they open the taps for the people. They also said that the Water Point Committee members are the ones that talk to the Directorate of Rural Water Supply and provide feedback to the community. Two of the participants said that the water in their area is managed by the Namibia Water Corporation (NamWater). They referred to the management of the Etaka dam specifically. Another participant, however, said that no one manages the dam and that *"anyone can tell others what and what not to do when it comes to using water from the dam."* Two other participants said that they manage their own wells. Similar to Okalonga B, all of the 8 participants from Onandjandja said that they know how water in their area is managed and are aware of the institution(s) responsible for managing the different water sources (Table 5). Of the 8 participants, 7 participants said that NamWater is responsible for managing the water sources except for the wells (as these are privately owned) whereas one participant said that their water sources are managed by the Water Point Committee. This participant was referring to the communal taps and boreholes.

It is evident that the community members are aware of the different actors in water management and the different levels of governance such as the Directorate of Rural Water Supply at regional level and the Traditional Authority at the local level. There does, however, seem to be confusion especially in Onandjandja around which institutions are responsible for managing the different water sources. This is in reference to respondents from Onandjandja stating that the boreholes and communal taps are managed by NamWater. According to Werner (2009), the Namibian policy on rural water supply points out that local communities are transferred ownership of water points. The ownership of water resources below and above the land surface, however, lies with the state. Furthermore, the facilities of rural water points and supply schemes are leased to the Water Point User Associations and Water User Associations by the state. Open water sources are open to anybody but restrictions around use apply. The hand-dug wells, which play a significant role in water provision, are owned by those who dug them on their own land. They, therefore, have control over the access of the

water. These wells are not governed by the Water Resources Management Act (Werner, 2009).

It seems the roles and responsibilities of the different actors that are responsible for managing the water sources are not clear to the community. The confusion by the communities about the roles and responsibilities of the different actors can be attributed to poor communication and information sharing between the different actors. According to Garande and Dagg (2005), communication and information sharing can determine the understanding a community has about a particular issue and the general status of a project or strategy such as the CBM strategy. The same authors, therefore, stress the importance of clear communication at the implementation phase of a project. They also stress the importance of putting in place clear communication channels so that stakeholders are kept informed about any modifications to the project and/or modifications to the implementation strategies (Garande and Dagg, 2005). This confusion may, therefore, limit the communities' participation in the governance of the water resources as they are not sure which institutions to go to for a particular issue. It also has the potential to undermine the management of water in the area and cause tensions between the communities and the institutions. Research conducted by Mapaure (2010) in two villages within the Oshana region of Namibia concluded that there was tension between the Traditional Authority and the Water Point Committees as a result of unclear roles and responsibilities. In that study the Kwanyama Traditional Authority did not recognise the Water Point Committee in the two villages because according to tradition, the customary leaders were responsible for the management of water and not Water Point Committees. Once the Water Point Committees were elected, they no longer applied customary law by taking directives from the traditional leaders. They also no longer reported to the Traditional Authority but reported directly to the responsible extension officer of the Directorate of Rural Water Supply which was seen as a top-down approach by the Traditional Authority. This infuriated the Traditional Authority who then disregarded the Water Point Committee and stopped communicating with them.

5.2. Community participation in water governance

The World Bank (1996) defines participation as "a process through which the public influence and share control over development initiatives, decisions and resources which affect them." This section will explore the extent to which the communities of Okalonga B and Onandjandja are engaged in the governance of their water resources.

5.2.1. Membership in water related associations

Table 6.Responses from participants about being a member of a water association. A total of 20 people were interviewed, 12 from Okalonga B and 8 from Onandjandja.

Member of a water organisation?	Okalonga B (n)	Reason	Onandjandja (n)	Reason
Yes	4		1	
No	8	Do not know the process of becoming a member (n=4)	7	Do not know the process of becoming a member (n=5)
		Not elected (n=2)		Not elected (n=2)
		Obtain water from private hand-dug well (n=2)		

As illustrated in Table 6, it would seem that communities from both villages are unfamiliar with how one becomes a member of a water association. This information is explained in the CBM strategy, which is then explained to the community by the Directorate of Rural Water Supply, as it explicitly mentions that communities that make use of the communal taps form part of the water association for that specific tap and are not elected. They would then elect the members that will form part of the Water Point Committee that will be in charge of the day-to-day management of the communal tap (Republic of Namibia, 2008). The poor knowledge in the community of how to become a member of a water association could be a result of poor information dissemination and capacity building by the Directorate

of Rural Water Supply's extension office. According to the Directorate of Rural Water Supply, there is a lack of man-power under the extension services. This, therefore, makes it nearly impossible for them to reach all the villages within the constituency. If there was better participation from the community through the water user associations, there may be better collaboration with the rural water supply extension office which would then help the community obtain a better understanding of the management issues that are at stake. This would also allow for an opportunity for the community to assist the government in managing the opening up of the communal tap in Okalonga B more effectively. This type of collaboration is especially important when the government does not have enough resources to manage an issue effectively (Huitema et al., 2009) as with the case of the Directorate of Rural Water Supply. The Directorate of Rural Water Supply indicated that they do not have the necessary funding and manpower to effectively monitor and manage the water sources in these two villages as well as the other villages in Onesi constituency. A study conducted by Sabatier et al. (2005) showed that collaborative approaches between the United States government and other stakeholders in water management projects helped to diffuse complicated problems such as transparency and accountability from the US government. Moreover, the same study showed that these collaborative approaches may better fit at addressing the actual problems that are faced by the communities (Huitema et al., 2009).

5.2.2. Participation in meetings or workshops

Table 7.Responses from participants about participating in meetings or workshops. A total of 20 people were interviewed, 12 from Okalonga B and 8 from Onandjandja.

Village	Participated in meetings or workshops	Reason
Okalonga B	Yes	It is a platform for raising concerns (n=4)
Onandjandja		It is a platform for raising concerns (n=1)
Okalonga B	No	Time (n=2) Distance to venue (n=2) Attending will not make a difference (n=2)
Onandjandja		Time (n=5) Distance to venue (n=2)

There seems to be a lack of participation in meetings and workshops by the communities of the two villages. When participants of Okalonga B were asked if they participate or have participated in meetings or workshops related to water, 8 (66%) of the 12 people that were interviewed said that they have not participated in meetings or workshops related to water (Table 7). The reason given by most (4) participants was that they have not had the time to participate in meetings or workshops. They do, however, feel that if they had the time they would attend meetings because this is the platform in which their voices will be heard as well as a platform to share information, tackle issues and make collective decisions. One participant was quoted saying that "*I have not been able to attend meetings but I know that is important to attend and participate because this is one of the ways in which we can raise our concerns.*" Another reason given by 2 of the participants as to why they have not attended meetings or workshops was that they felt that attending meetings or workshops

will not make a difference. This comment was made in reference to the tap that has not been opened since 2013 after meetings were held to dig the trench for the pipeline. It seems these community members have since lost confidence in meetings. One of these two participants said: "*I know that meetings have been taking place. I hear them announce it on the radio but our situation has not changed, we still do not have tap water.*" Two other participants said that they cannot attend meetings or workshops because of the distance needed to travel to Onesi where most of the meetings take place. One of two participants that mentioned distance as the main barrier to attending meetings or workshops said: "*I would like to attend meetings but would have to travel a long distance. I do not have a car and walking would be too much for an elderly person like myself.*" However, four out of the 12 participants said that they have participated in meetings. They all said that this is one of the most effective ways to ensure that their voices are heard and that they are part of the decision making process. One participant was quoted saying: "*If I do not go to the meetings, how will the people in charge know what my problems are? This is how I make sure I am heard, otherwise I cannot complain.*" It is evident from that the distance to meetings is a problem because of lack of transport. The Omusati region was found to be the third most deprived region in terms of employment, according to a study conducted by the National Planning Commission (2011). This means that the majority of the community members in the area cannot afford to own private transport and would have to either walk or hitchhike to Onesi to attend meetings as there is no public transport. Walking long distances and hitchhiking are strenuous activities especially for the elderly.

Similar to Okalonga B, the majority of the participants in Onandjandja (7 out of 8) said that they have not participated in meetings or workshops related to water (Table 7). Similar reasons as that to Okalonga B were given; 5 participants said that they do not get time to attend meetings or workshops because they are usually attending to their fields, collecting water or at work whereas the other 2 participants said that they have not attended meetings or workshops because of the distance. Unlike in Okalonga B, none of the participants in Onandjandja mentioned that attending meetings would not make a difference. This could be because these communities have better access to communal taps and private taps as

compared to the communities of Okalonga B who still have not had the communal tap installed even after meetings were held. It was also expected for the respondents that said that distance is a barrier to attending meetings to be more because Onandjandja is much further from Onesi than Okalonga B. It could be that the number of participants that said that distance does not affect their ability to attend meetings is low because of the higher number of communal taps and private taps in Onandjandja than Okalonga B. This might place the communities of Onandjandja in a better position to earn money from water-related livelihood activities thus being able to afford transport to attend meetings that are far away. According to Franks and Cleaver (2007) the poor can use water to improve and support their economic status through the development of other forms of income streams. This was also found in another study where access to water was found to double the income of the poor rural women in rural areas of Uganda (Payne et al., 2008). In Onandjandja, for example, it was observed that informal selling of goods was concentrated around the communal taps along the main road. This was merely where they sell their goods as they have better access to water for making bread and cooking other meals that they would then sell.

The Traditional Authority indicated that Okalonga B and Onandjandja communities previously participated more in meetings and workshops in the past but participation has declined. Contrary to this, according to the Directorate of Rural Water Supply community participation from the Okalonga B and Onandjandja villages seems good. These contradicting views could be an indication of poor communication or interaction between the local level actors (Community and Traditional Authority) and the regional level actors (Directorate of Rural Water Supply). As literature indicates, collaboration between different stakeholders is an important aspect in the governance of common-pool resource management and the lack thereof can result in the resource being managed ineffectively (Klijn and Koppenjan, 2000; De Bruijn and Heuvelhof, 2002). It can also result in the build-up of tension between the various actors which can result in conflict.

The Traditional Authority indicated that minority groups participate in meetings and workshops. However it was also mentioned that minority groups *do not always speak*

because they are shy or uncomfortable and that women are the most active in meetings and workshops followed by the youth. There is, however, a question on whether attending a meeting or a workshop without making any contributions constitutes having fully participated in that activity. The World Bank's definition of public participation suggests that there be some form of engagement by the participants in issues that affect them. Furthermore, according to Singh (2006), for effective participation to take place, stakeholders need to actively influence and share responsibilities in implementation.

The good representation of minority groups and women in meetings (as indicated by the Traditional Authority representative) in Okalonga B and Onandjandja is contrary to literature regarding representation from minority groups and women around the world. Literature generally suggests that women and minority groups are poorly represented in activities related to the provision of water and the management of their water resources. Women's participation [or rather lack thereof] in water management institutions has been the centre of most 'gender and water' literature (Harris, 2009). A study conducted by Blair (2000) concluded that women in the rural areas of Honduras and Bolivia were poorly represented and their representation in water related projects or activities were not mandated by the government. This was the same for women in the Philippines. Moreover, the minority ethnic groups in all three countries were also underrepresented in meetings related to the provision and management of their water resources (Blair, 2000). In a study conducted by Singh (2006) on 121 rural water projects, it was also found that only 17 percent of these projects had a high level of involvement by women. It was then found that the participation by women in these projects had not improved a few years later (Kevany and Huisingh, 2013). Panda (2007) and Singh (2006) further found that when it comes to gender biases in the development and management of how water is distributed, women's contributions are generally limited. This means that globally women from developing countries rarely participate in community efforts in distributing and managing water equitably (United Nations' World Water Report, 2012). The poor participation by women in the distribution and management of water is often a result of a lack of support from their husbands as well as a result of the perpetuation of gender biases and gender roles. Furthermore, participating in political activities is

perceived as a distraction from their domestic responsibilities as political activities are seen as time consuming (Kevany and Huisingh, 2013; United Nations' World Water Report, 2012). It is, therefore, unpopular in rural communities for women to be part of policy decisions related to water (United Nations' World Water Report, 2012).

In most traditions, women are not seen as equal to men and men are usually regarded as the decision-makers in the household. Women had no say in decision-making. These traditional norms translated into governance structures which saw women being underrepresented at the national level in government (Sultana, 2013b). In Namibia, however, it is mandatory to have a 50/50 gender representation in all decision making roles as women were previously underrepresented as a result of traditional norms. The CBM strategy, therefore, requires 50/50 gender representation on all Water Point Committees. According to the Directorate of Rural Water Supply, there is a strict policy on ensuring that women are represented on the Water Point Committee on a 50/50 basis.

Overall, the lack of participation in meetings in both villages puts into question the effectiveness of the CBM strategy in reaching its aim which is to empower the local communities and to transfer authority and assets to the community (Schnegg, 2016). By not participating in meetings, the community members of the two villages are not part of the decision-making process and are, therefore, not entirely managing the water resources. In order to ensure better effectiveness and sustainability of service provision, community participation in water resource management is essential. Furthermore, community participation in water resource management promotes women empowerment as well as the empowerment of economically disadvantaged people (Cleaver and Toner, 2006). Community participation in the provision of water supply is also considered to improve water governance at the local level (Cleaver and Toner, 2006). Furthermore, the quality of decision-making would also be improved as participation by the community would make decisions more transparent and implementation would be smoother (Huitema et al., 2009).

5.2.3. Channel of communication

In order to understand how communities communicate their grievances or suggestions as well as get a sense of the interactions between community members, the water point committees and the Directorate of Rural Water Supply, participants were asked if they are aware of the channel of communication between them and the authorities. In Okalonga B, 8 of the 12 (66%) people that were interviewed said that they know the channel of communication. When asked to describe the channel of communication or explain who they would go to and in what order, the answers were split between two channels. Four of the participants said that they would go to the Headman who would then go to the councillor whereas the other 4 said that they would go to a representative of the water point committee who would then contact the councillor's office. Four participants on the other hand said that they are not sure of the correct channel of communication but would go to the Headman as the first point of contact. The same channel of communication was found in Onandjandja; 6 out of the 8 (75%) participants said that they know the correct channel of communication between them and the authority. Of the 6, 3 people said that they would go to the Headman who would then go to the councillor's office whereas 1 person said that he would go to a representative of the water point committee and that representative would then take the matter up with the councillor. The other 2 participants said that they would go directly to the councillor's office which was not mentioned in Okalonga B.

Similar to Okalonga B, the remaining two participants of Onandjandja said that they are not sure of the correct channel of communication but would go to the Headman first because he is the closest person with authority to them and because they usually report their grievances to him. One of these two participants was quoted saying: "*I am not sure who I can report to if I have a problem. I think it is to the headman as he is closest to us. Otherwise I will have to travel to Onesi to see the councillor.*" It would seem that in both villages the channel of communication concerning water related issues is not clear. This confusion was also highlighted in the interview with the Directorate of Rural Water Supply. This person pointed out that the line of communication does not seem to be clear as some community members

do not know who to contact with grievances such as need for potable water. According to the Directorate of Rural Water Supply, the first point of contact for the communities should be the water point committee who would then go to the regional council office (councillor) or traditional authority (Figure 8). The regional council office or the traditional authority office would then take the matter up with the Directorate of Rural Water Supply and communicate it back to the community. If matters such as funding require intervention from the head office, the extension services office is responsible for contacting the head office. The Directorate of Rural Water Supply further stated that the community as part of their Water Association can contact their office directly about any concerns or questions that they might have.

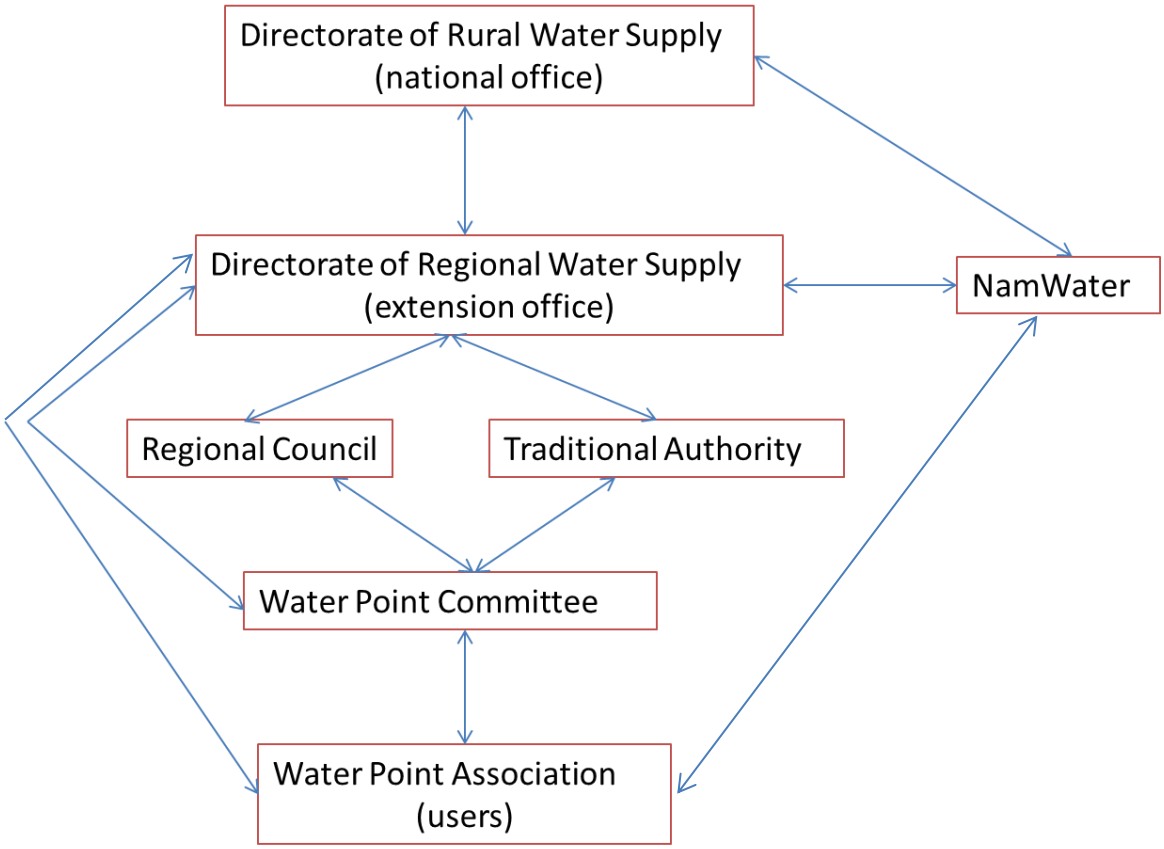

Figure 8.Channel of communication between the different actors.

The lack of knowledge around the channel of communication in the two villages can result in communities' not willing to participate in water related projects such as the management of communal taps. The most common difficulty with the public participation process, according to Mostert et al. (2007), is the lack of clarity around the different roles of the

stakeholders that are involved in water development projects which results in the stakeholders not knowing the correct channel of communication. The lack of clarity can destroy the motivation to participate as stakeholders may doubt their input will make a difference. This could be a reason why the interviewed communities of Okalonga B felt that their participation in meetings or workshops would not result in them getting their communal tap opened. Perhaps if there was better communication between the different stakeholders, the communities of Okalonga B would feel more confident in participating in water related issues. A study conducted by the European Commission (2003) showed that the lack of clarity on the role of stakeholders in the Harmoni COP case was as a result of poor communication and miscommunication between the different stakeholders. The Harmoni COP was a project that was aimed at improving the conceptual base for participatory planning in river basin management of a number of European countries (European Commission, 2003). Furthermore, Rogers and Hall (2002) point out that a project has to be inclusive and communicative, with free flowing communication channels in order to improve transparency. These factors enhance the effectiveness of governance at community level (Rogers and Hall, 2002). Moreover, a better flow of information between the different actors will possibly also improve the communities' understanding of the management issues that are at stake as well as encourage better coordination of actions by the different actors (Huitema et al., 2002; Rogers and Hall, 2002). This may then encourage better and more serious follow-ups on issues or inputs received during meetings or workshops (Huitema et al., 2009).

In conclusion to the chapter, there seems to be confusion around who is responsible for the management of the water sources amongst the communities and how best they might participate in water governance. Furthermore, the roles and responsibilities of the different actors do not seem to be clear to the communities. This confusion has resulted in them not effectively participating in the governance of their water sources. It is possible that if there was less confusion, communities would have the knowledge and confidence to ensure that water, especially potable water, is more accessible to them by reducing the different barriers discussed in the previous chapter. In Dar es Salaam (Tanzania), for example, communities of

two settlements were able to improve their access to potable water by participating in the management of their water resources. Their participation enabled them to mobilise and use a number of resources such as their expertise and experience, their ideas, ability to organise, their finances and labour (Kyessi, 2005). There is potential for the communities in Okalonga B and Onandjandja to follow the same approach by participating more in the management of their water resources. Like the two settlements in Tanzania, the communities of Okalonga B and Onandjandja can collectively improve their access to potable water by utilising their resources. This would also reduce the dependence on government to improve their access to potable water.

Chapter 6: Conclusion

The aim of this study was to understand how access to potable water affects the well-being of communities living in the Cuvelai-Etosha basin in Namibia and to understand how these communities participate in water governance. The *Okalonga B* and *Onandjandja* villages were used as case studies. In order to achieve this aim, three objectives were identified. These were to examine how water is accessed and determine what the barriers are in accessing potable water, to examine how access to potable water affects the well-being of the communities and to explore how communities are engaged in water governance. The study found that the communities of Okalonga B and Onandjandja access water through hand-dug wells, private and communal taps, Etaka dam and Oshana, and boreholes. A total of 6 barriers to accessing potable water were identified by this study. The barriers that were mentioned by the community members were poor administration and maintenance of water infrastructure, distance to communal taps and amount of water one can carry, ability to pay the set water fees and specific times allocated for collecting water. Limited access to potable water negatively affects the well-being of communities of the two villages. It has been determined that communities of Okalonga B and Onandjandja use water from contaminated sources as a result of limited access to potable water, which resulted in these community members falling sick and becoming less productive.

The study further showed the importance of water access for well-being not only for household use as identified by Kyessi (2005) but also for alternative livelihood opportunities. The communities of the two villages felt that they would have better economic opportunities if they had access to potable water which would in turn improve their well-being and livelihood opportunities. In order to improve the well-being and livelihood opportunities of these communities, water access needs to be improved. It is, therefore, suggested that transdisciplinary research on improving access to potable water is conducted. Sturm et al. (2009) suggests rainwater harvesting as an alternative source of water for rural communities. This research can be expanded to more villages within the Onesi constituency and can use examples from other villages in north-central Namibia that use rainwater as an alternative

source of water.

In addressing the objective around community participation in water governance, this study also found that there seems to be confusion around who is responsible for the management of the different water sources and how best they might participate in water governance. Furthermore, the roles and responsibilities of the different actors do not seem to be clear to the communities. This confusion resulted in them not effectively participating in the governance of their water sources. It is possible that if there was less confusion, communities would have the knowledge and confidence to ensure that water, especially potable water, is more accessible to them by reducing the barriers. Although participation in water governance by the communities was found to be generally poor, it was found that women and minority groups attend meetings and workshops which is contrary to literature. There is opportunity for further research into understanding the broader context of water governance as this study focused mainly on community participation. Understanding the governance of water is vital in ensuring that potable water is accessible to all in an equitable manner as outlined by the recently adopted sustainable development goals (Bock et al. 2008). Furthermore, the governance systems that are currently in place need to be reviewed and better co-ordinated to ensure there is sustainability in the water provision process. If water is not governed well, the potential negative implications for global and especially community level freshwater resources are staggering. The negative implications for freshwater resources may include a reduction in the resources as well as pollution of freshwater resources (Rockström et al. 2014).

There are currently few collaborations with non-governmental institutions and private institutions that exist in the governance and management of water sources in Okalonga B and Onandjandja. There needs to be less dependence on government and more involvement by private sector and civil society through NGO's in the provision of potable water and the management thereof. The government can make use of civil society organisations such as the Desert Research Foundation for capacity building activities and interventions such as providing alternative water sources to the communities. The government, through their

extension office, currently does not have the manpower to ensure regular engagement with the communities. The Desert Research Foundation has in the past initiated projects related to improving water access to rural communities in the Cuvelai-Etosha basin. An example of such projects was CuveWaters which was a project aimed at giving people in the Cuvelai-Etosha basin a sustainable and reliable supply of access to clean water, thus improving their livelihood and health, and creating job opportunities. A project like this can be extended to the Onesi constituency through funding from international donours such as WaterAid and the Global Water Partnership. Furthermore, private sector such as banks can be engaged to provide funding for projects initiated by the community. Communities may be more eager to participate in water resource management and governance if they initiate activities related to water provision themselves (Huitema et al., 2009).In 2007, a community in the Oshana region of Namibia initiated a hammer mill project for generating income to improve their livelihood. This project received funding from the Standard Bank of Namibia and project implementation support from government through the Ministry of Gender Equality and Child Welfare (New Era, 2007). This is an example of where collaboration between communities, government and private sector yielded good results and can be emulated by the communities of Okalonga B and Onandjandja for projects related to improving access to potable water.

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Appendix A: Interview guides

Governance questions: Targeted at:

- Water point committee member
- Traditional Authority
- Directorate of water supply and sanitation (rural water supply extension office)

Questions to guide the discussion:

• What are your roles and responsibilities around managing and/or accessing water?

• How accessible is potable water to the communities of the Cuvelai-Etosha basin? Do you know of communities that do not have access? Do you know of people within communities that have less access than others?

Guiding questions for an institutional and contextual analysis on water

Village supply

• Who is responsible for the maintenance of the different water sources for x and y village?

• Who is responsible for ensuring the supply of water to the communities of x and y village?

What are the challenges in supplying water to the communities of x and y village?

Policies and responsibilities

• What are the most important and relevant policies (or Acts) related to water?

How are the roles and responsibilities around water management distributed between the national and regional and local levels and is this distribution clear?

• How are water management roles and responsibilities distributed in the basin? Is this distribution clear? For example: Are coordination mechanisms in place?

Who are the most important actors in managing water resources in the basin? Are some actors more powerful than others?

Community access to water and engagement in water governance

• What is the pricing structure of water for consumers? Which groups benefit (for example, from subsidies)? Are there groups who's needs are not met?

- Are there particular social factors that impact on access to water for certain groups or sectors?

• How is information about water and its use passed on to the remote communities?

• Do certain legal provisions guarantee participation of local communities in decision making related to water?
• Does the community participate in water-related activities? If yes, how? If not, why? Is the participation often representative of the community? Do you see regular participation of minority groups?
• Who, from the communities, generally participates in meetings/workshops etc? Do you see more women or men, more youth, elderly?
• How might better participation in water related activities of [vulnerable groups] be improved (if necessary) and supported?

Local level questions: Targeted at community members

1. To explore how community members are engaged in water governance

   - Are you a member [oshilyo/iilyo] any water association/committee [ehanganolyomeya]? If yes, how did you become a member [osheendangiiniopowukaleoshilyosho committee]? If no, why not?
   - Do you know how the water in your area is managed and by who [omeyageniohamutonatelangiini? Omunaomuwiiliki? Iilongayayeoyashike? Eelandulathanoolilingiini]?
   - Channel of communication
   - Have you participated in any meetings or workshops related to water [owakuthilengaaombingamomitumbanengemomadhewulogenashanomeya]? If yes [omolwashikeshapumbiwaopomukaleamuningiilwaomadhewulo (workshop) kombingayomeya?] If no [omolwashikembela? Kuweteshapumbiwa?]

2. To examine how water is accessed and determine what the barriers are in accessing potable water for the communities.

Water use e.g. drinking, washing/cleaning, garden (oshikuunino), fields (epya), livestock (iimuna) [omeyangaamunaohamugalongitangiini/shike]	Where water comes from [omeyangaamunaogazapeni? Opayipindjiyetaomeyapomukundagwenioyazapeni?]	Challenges in accessing this water [uupyakadhiwashikehamutsakanekeokukatalaomeya] [uupyakadhiwashikehamutsakanekemokulongithaomeyagomomithima/kombingayuundjolowele]	Costs associated with accessing this water (money/time/ school – miss class (eetundi) dirty uniform) [openaofutoyashaopomumoneomeya? Ngashi nee lombingayoshimaliwa, ethimbolyokukateka, noshotuu]

- To what extent do you feel you are able to access all the water you need [omeyangaahamumonoogagwanenaeempumbwedhomegumbo – ookunwa, okuteleka, okukosha, okwiikosha, okutekelaishikunino/iimeno/omiiti, noshotuu?

- Do you feel that your access to water is better or worse than others in your village? Please explain

- Who has the most difficulty in getting the water they need [shi nee munaomeyagelikokule, aantuaayesheaavulungaaokwiimonenaomeyokuyoyene? Ngashi nee kombingayakulupe, iilemananona?] Why [omolwashiketotilengaaka]?

- How could your access to water be improved (at the village level) [shiwatalaoshikeshinaokuningwaopoaantuayesheyakaleaayavuluokwiimonenaomeya]?

- How could your access to water be improved (in terms of the basin or regional support)?

3. To examine how the well-being of the communities in the two villages is affected by water access [uukwatyawonkalamwenyo]:

- Are there any activities that you would like to engage in but can't because of limited access to water [Opunambelaiinimawahalaokulongandeleiitovulushahsikapenaomeya]?
- What are your most important goals or things you would like to have to live a good life [iilalakanenwayiiniwunanengewahalaopowukalewunaonkalamwenyoombwaanawa] (list 3)?
- How satisfied are you with achieving these goals on a scale of 1-5 [iilalakanenwa/eempumbwedhiwatumbulaoponunandodhimwewedhitsakanithanengewedhigwanithapo, ngeondati nee yitulakoshivihaeempumbodhinoowedhiwanithauunene, opokati, nengeinodhigwanithanandenande]? 5 being the highest and 1 being the lowest
- How satisfied are you with your life as a whole on a scale of 1 -5 [shiwatalaonkalamwenyoyoyeoweyipandula, ngeondati nee yitulakoshivihaowapandulauunene, opokati, nengeinopandulanandenande]? 5 being very satisfied and 1 being not satisfied
- Do you think availability of water affects your ability to achieve your goals [shiwatalaokukalawunaomeyoashikwatheleokuwanithaiilalakanenwa/eempumbwem

biwatumbulametetekelo – ngashi nee watiowunaeelalakanolyokutekulaeeshi]? Please comment [omolwashiketotilengaka?]

- Do you have any questions and/or comments? Owunapo wee shawahalaokugwedhapoinatushikundathana?